



FRIDAY, JANUARY 21, 1881.

Train Signal Holder.

The engravings herewith represent an arrangement for attaching signals to the rear end of trains, which has been devised and put in use on the Delaware, Lackawanna & Western Railroad by Mr. F. W. Coolbaugh, of Hoboken, N. J.

The invention consists of a socket for holding a flag-staff, and a spring clip for holding a lantern. These are attached to a metal plate which is fastened to the side of the car near the end, as shown in fig. 1, which represents the end of a car with the signal lamps in their position. Fig. 2 is an enlarged view of the signal-holder with a lantern attached. Fig. 3 shows it with a flag. The spring clip, which holds the lantern, it will be seen, is hinged so that when not in use it can be turned up into the position shown in fig. 3, and when in use is placed as shown in fig. 2. The hinge by which this clip is attached to the metal plate is what the inventor calls

As regards the prefix "great" to some of our companies' names, it is merely a relic of the importance that attached in the old coaching days to the leading roads out of the capital—Great North road, Great West road, etc. It is not, however, used by many of the principal corporations, for example, the London & Northwestern, the Northeastern, the Midland, North British, Caledonian and so on.

Stations: In 1825 the trains of the Stockton & Darlington Railroad were advertised to start from their respective depots, but the word is now exclusively confined to goods stations. Here again there is a reason. Depot means store. Passengers are not stored, at least not willingly, while goods are. [2.]

Carriages: The word car is in England mostly associated with a light open vehicle drawn by one horse, and quite unsuited for the shocks to which railway rolling stock is subjected, hence carriage. It must be noticed, however, that we use "car" when speaking of tramway carriages and Pullman's. The term used by the companies themselves in all printed instructions in their reports is "coach." [3.] The first railroad trains were simply stage coaches, coupled together, the ordinary wheels being superseded by flanged ones. By the same token the old names guard and driver were retained for what you term "conductor" and "engi-

run Pullman cars charge for the accommodation, but that is an affair of the Pullman Company. Speaking generally, first, second and third-class passengers are carried by all trains, at ordinary fares. [7.]

Regarding tickets, I don't think there is much to choose between our system and yours. The American mode perhaps saves the companies some loss from the surer detection of "dead-heads," etc. But the incessant demand to show your ticket is very exasperating on your lines, as your own countrymen—Mark Twain, for instance—avow. Especially is this the case at night, when you are trying to get such snatches of sleep as the sleeping car will allow of. On our lines the demand is only made when arriving at terminal stations or important junctions, and then only at special ticket platforms, where every one expects it. [8.]

Your admirable check system for passengers' luggage requires no comment. Every one knows it and acknowledges its excellence. Its non-adoption here is simply one of those extraordinary instances of perverseness that distinguish man from the beasts.

All express, and most ordinary, trains in the country have some means provided of attracting the attention of the guards, generally some sort of electric bell. Doubtless the system is not perfect, and even if it were it is liable to be ig-



Fig. 2.

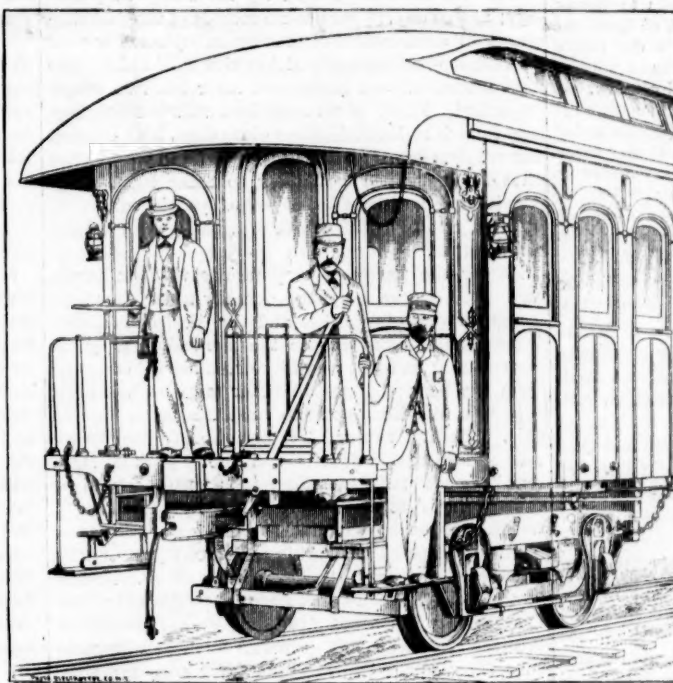


Fig. 1.

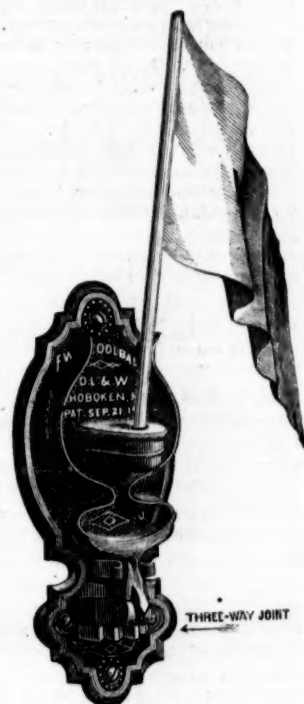


Fig. 3.

COOLBAUGH'S TRAIN-SIGNAL HOLDER.

a "three-way joint," which permits the clip to be placed in a position so as to project out at right angles to the side of the car, or be turned so as to point either forward or backward. The clip will take any size of lantern, is ornamental in design, and can be used for passenger or conductors' cars or locomotives.

From fig. 1 it will be seen that it is not easy for any one on the rear platform to obstruct the view of the light. This could only occur if a tall man was standing on the upper step and was leaning outward. By placing the signal-holder up a little higher even this would be impossible.

The signal, being displayed on the side of the car, can be seen by the locomotive engineer and fireman, and can also be seen better by a following train when rounding curves.

The lamp or flag is also always at hand, and can be used without a moment's delay to protect the rear end of a train in case it is necessary to send a flagman back. The lamps, in the position shown, are also much less liable to be broken or injured than they are if attached to the platform or railing.

Contributions.**English Railways and American Railroads.**

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have recently come across an extract from the (New York?) *Commercial Bulletin*, wherein the writer treats of some differences in American and English railway travelling. Though the article is dated July, 1880, and is now, therefore, somewhat stale, I trust you will allow me the opportunity of explaining some things that have doubtless appeared strange to one fresh from the States. I am the more anxious to do so that the criticisms are not unkindly, and are evidently the observations of an intelligent and not too-prejudiced man.

First as to nomenclature. Exception is taken to the word railway. Well, fifty years ago it was railroad in England, as it still is in the majority of cases in the States, but railway is an easier word than railroad, not exacting the final hard d. *Railway* is gradually creeping into use with you, and will ultimately oust the other word; as it is consonant with the genius of our common language to adopt short, easily pronounced words. [1.]

neer." In the old days the term "guard" as applied to a mail coach was significant enough. He had to guard the mails, sometimes with his life, against highwaymen, and was then always armed. Your term "conductor" is appropriate, but I must demur most decidedly to calling the driver of a train an engineer. He is no doubt a highly intelligent mechanic, but he is no more an engineer than the guardian or watchman of a big store is an architect. [4.]

The remarks as to English railway carriages must refer to very ancient specimens. I, a Londoner, have never seen one of the sort described, though they may exist on some out-of-the-way branch lines. The modern English railway carriage is, as a rule, about 30 ft. long, and contains four compartments, first or second-class, and perhaps five of third-class. Each compartment seats eight or ten passengers, according to class. The reason English railway carriages are built in this way is not solely on account of national exclusiveness, but because the American system of only two exits in a long car would be impracticable on our lines, where there are so many trains and such frequent stations. In a run of say fifty miles out of London, a stopping train has to draw up at fifteen or twenty stations. By our system of a door for each ten (at least) passengers, the time occupied in getting in or out of a carriage is reduced to a minimum. The London underground railways, with stations half a mile apart, trains at three minute intervals, and stops of fifteen seconds or so, could not be worked with your long carriages having only two doors. [5.] Taking the whole of the kingdom, the second and third-class railway carriages are certainly open to improvement; but these improvements are being made as fast as circumstances will allow. But it must be remembered that the teak or oak-framed English railway carriage takes a long time to wear out, and it is only as they require repair, or new stock is added, that a convenient opportunity arises. We have not the resource you have of shunting inferior stock on to the six or seven thousand miles of new line opened every year. [6.]

The statement as to express fares requires much qualification. On three or four passenger lines out of London there are express fares by certain trains, but they are few in number, and are run as "extras" to the regular traffic, for a special purpose. On the big main lines express fares have been abolished years ago, and you pay the same whether you travel twenty-five or sixty miles an hour. Those lines that

nored at the very time most needed. Public opinion demands that the provision shall be made, but it is unpopular with the railway managers, because when it is used it is very often for some utterly inadequate purpose. I have heard of an express train being stopped between two block sections because a passenger wanted a light for his cigar! [9.]

It is a very popular idea with Americans that engine drivers here have no shelter. As a matter of fact, the caboose (cab we call it) [10] has been pretty general for the last twenty years, but in addition to our climate not exacting the same degree of shelter for the men, and the acknowledged fact that Americans are more sensitive to atmospheric conditions than we are, the weatherboard, especially if it is curved at the top, affords nearly as much shelter as the cab, while the latter is not at all liked by our drivers. On one line, when a new Locomotive Superintendent tried to introduce cabs on all the engines, from motives of what he deemed humanity, there was almost a riot among the men. One said he objected to the absence of air; another "felt like as if he were in his coffin." Anyhow the cabs were removed. Nevertheless they are much more general now than formerly, and in the case of tank engines running either end foremost they take the form of inclosed chambers, with a narrow opening on each side.

Another favorite notion with your countrymen is that we know nothing about the bogie truck. This was used by George Stephenson on engines built forty or fifty years ago, and is no more an exclusively American contrivance than any other part of the locomotive. [11.] It has been resuscitated of late years because the lines recently built in England have much sharper curves and steeper gradients than formerly—conditions where the advantages of the bogie are manifest. The reason it was not more used at first was that our main through lines are of the most solid and expensive type of construction known as regards road-bed, and the bogie is not a necessity under such conditions. Moreover, in the case of derailment at high speed, the bogie introduces an element of positive danger from its tendency to swivel round like a castor, and upset the engine. In such cases the ordinary rigid engine has a much greater chance of keeping upright. [12.]

There are no bells on our engines, because they don't run through the streets, as with you. Level crossings are always

protected by gates and watchmen. There are no cowcatchers, because all the lines are fenced.

There is only one other point in the article referred to requiring comment; that is as to locking the carriage doors. It is contrary to law to lock the doors on both sides, so that the passenger is never "locked up," as the writer would imply. But our system of taking tickets renders it convenient occasionally to lock the doors on one side, to prevent people who have not taken tickets from getting on board. It is also a safeguard at terminal stations to prevent passengers getting into the wrong trains. About five minutes before starting the ticket puncher comes round and sees that each passenger is on his proper carriage, he then locks the door, and if any other passenger presents himself before starting he has to show his ticket. Again at road-side stations it is useful in preventing passengers from getting out on the wrong side instead of where the platform is. But the restriction is one that does not much interfere with one's convenience, and if it did there are generally passengers present who have keys of their own.

In conclusion, I may remark that the English are free-traders in railway management as in other things, and there has never been an indisposition to adopt improvements from other countries—notably from yourselves, as witness Pullman cars, Westinghouse and other brakes. But in criticising the customs of a people it is well to inquire into the reasons for differences from one's own practice, rather than to assume that such differences are necessarily the result of ignorance and stupidity. On the whole, our system suits our people better than yours would, owing to the different conditions existing between a small and densely crowded country, and a big, sparsely inhabited one. Our railway managers are perfectly cognizant of the details of American practice and of that in all countries where railways exist, and they adopt what their experience shows is best suited to the wants of the people; and, deficient as our system may seem to you, we yet manage to go from London to Edinburgh—400 and odd miles—in nine hours, and dine comfortably on the road if need be, which is not bad traveling. [13.] F. G. D.

[So far as this is a criticism on the article in the *Commercial Bulletin*, it is hardly in place here, because we and our readers have no means of knowing what that article was, except the few references made to it in this letter itself. If it simply set forth the differences between English and American railroad practice and vocabulary, there can be nothing to complain of; if, however, it asserted or assumed that the English differences, were so many points of inferiority, the writer was, like a good many others, able to appreciate only what he was accustomed to. It is one of the commonest things in the world for people of one country to assume that what suits them and their countrymen is best for everybody; but it is even commoner to consider as condemnation a simple statement of the points in foreign practice which are strangest to the commentator, and will distinguish that practice most to his countrymen, though he may not have the slightest idea of asserting that our practice in these points would suit the foreign country better. Every railroad system and management should be adapted especially to the community which it serves; and the lack of three classes of car in American trains is no evidence of unfitness, any more or any less than their presence in Europe, or the use of fourth-class cars without seats at half a cent a mile in India. This our correspondent recognizes, but so do many if not most of those who are struck by and wonder at the foreign practices which are strange to them.

Below we make some comment on some of the points mentioned in the above letter.

1. By the last census there were 50,152,000 odd inhabitants in the United States. We believe we are within the truth to say that of that number not more than 152,000 habitually or naturally use "railway" in conversation, and that number probably includes none of the working force of railroads, except a few high officers who read English (that is, British) technical books and journals a great deal, and have based their vocabulary on what was evidently considered the best usage in these publications. Now one must have a very erroneous idea of the life and growth of language to suppose that a word in ordinary daily use almost universally by a homogeneous people of fifty millions, which has nearly as much railroad as all the world beside, and uses railroads more than any other people, will be changed because some of its own writers prefer another word, or because that other word is, or is supposed to be, an easier one. It might have been possible to change it forty years ago, but it is fixed now beyond recall as a part of the living daily speech of the people, learned in the family from childhood, and not from books. Whether one word is better than the other is no longer a practical question in the United States. Whatever a few literary men may do, "railroad" will always be the word used by the American people. And in favor of "railroad" it is to be said that it is a better base for derivatives than "railway." We can say "railroading," but not "railwaying;" and though we usually say

"railroading" with a protest now, a word of the kind is so greatly needed that it will probably become a recognized part of the "American" if not of the English language, filling the place of the useful German "Eisenbahnwesen," which has a precisely similar formation.

As for the deviation from English practice, it is little more objection in "railroad" than in other terms of railroad practice, and in these the American vocabulary is almost wholly distinct from the English. Go to an office here and ask for the superintendent, and you will be told that he is out on the road; in England he is "up the line;" we "switch," and the Englishman "shunts;" we run "freight" trains, he "goods" trains; he makes up the latter of "wagons," we of "cars;" we carry "passage" (as the French do), he "luggage;" and so on. The truth is, as is generally the case when a new art springs up in different nations of the same language, the terms of that art, which thus is developed independently in the two countries, are to a great extent different. On this fact is based the tracing of events in times of which we have no record by the study of philology; at this day, if we had no records of the past fifty years, an examination of the vocabulary actually used on railroads in England and America would show that this invention was introduced after the two people separated. There is an American railroad language and there is an English railway language, both correct, but varying greatly from each other; and we contend that it is impossible at this day to make them alike. The lingual inertia of 50,000,000 of people cannot be affected greatly by the efforts of writers, even if they act together.

As for the names of corporations, that has hardly any effect on the language actually used. Nowhere except in legal documents and the *Railroad Gazette* is much pains taken to use the term adopted by the corporation; and in a very large number of cases the term has been changed in order to give a new legal title with the least possible modification of the old title. When a railroad has been sold at foreclosure sale and reorganized, if it was the "A. & B. Railroad" before reorganization, it is very likely to be called the "A. & B. Railway" after it, but, except in writing letters in which the name is used, the term "railway" is used in working the road just as little afterwards as before; that is, scarcely at all. At this day, all our Eastern trunk lines are "railroads;" the Erie Railway has become the New York, Lake Erie & Western Railroad; of 252 corporations in New England only three have "railway" in their corporate title, and of 133 in New York only nine, and New England and New York go far in establishing the language of the nation. But these things count for very little either way; the people, nine hundred and ninety-nine thousandths of them, say "railroad," and we can't stop them if we try to.

2. Doubtless "depot" is a bad word for a passenger station; but it is probably too late to help ourselves. We write a great deal about "stations," but we always (or almost always) "go to the depot."

3. Railroad companies here of late years have introduced the word "coach" quite extensively, apparently to save the use of two words; for with us the vehicles are all cars, whether for freight or passengers, whereas in England freight is carried in "wagons." But we do not remember ever to have heard "coach" used in ordinary language, either written or spoken, and so far as "coach" has been introduced it is exclusively a technical term—used only by those engaged in "railroading."

4. In written documents many, and perhaps most American companies say "engineman" and not "engineer," but the public and the railroad officers themselves, even the real "engineers," are most likely to say "engineers." There is something very like it in England, where what we would call "machinists" call themselves "engineers," and have a great "Amalgamated Society of Journeymen Engineers." The Germans call the engineman a "driver;" the French get over the difficulty by calling him a "mechanic" (*mécanicien*), but then they call the locomotive the "machine."

5. The New York elevated roads run trains of American cars with only end doors; they make two or three stops per mile, and the length of the stops does not average half a minute. It must be said, however, that where a great many people have to get out at one station and many get on at the same station, this time is much lengthened; but on any road with stations three miles or so apart, especially if passengers were made to go out at one end and enter at the other, so that the incomers might be getting on while the outgoing were getting off, the delay would not be appreciable. If there was a door to every pair of

seats, every time a station was reached, with all these doors open the temperature would become nearly that of the outside air, and with the thermometer at zero and stops every minute and a half or two minutes (as on the elevated roads), this would be insufferable. Moreover, one brakeman (or guard) could not watch half a dozen entrances, and keep those who want to get on from blocking the way of those who want to get off, as he can the two doors (or platforms, rather) at the adjacent ends of two cars.

6. Very seldom do new roads buy old rolling stock, though such rolling stock is very generally worn out on branch lines, new or old, of extensive railroad systems: there is plenty of poor cars in America, however.

7. There are a few "express fares," or something equivalent to them, in America, as by the "limited express" between New York and Washington. It is certain a perfectly legitimate practice to charge for extra speed. The speed costs, and has value. Generally, however, here as abroad, it has not been found practicable or politic to do so.

8. "The incessant demand to show your ticket" is not a general American custom. On through trains you usually show your tickets but twice to the same conductor. But where there is nothing to prevent a passenger from getting on at any station without buying a ticket, as is generally the case here, for lack of a sufficient number of employés, of course the conductor must call for tickets after every stop. He usually asks them, however, only of those who got on at the last station: if he does not remember you, he will ask you again; but it is astonishing how the conductors remember faces. It is rare that one is asked for a ticket after retiring in a sleeping car.

9. The "intercommunication" problem is solved perfectly by the bell cord on a train of American cars, and Americans often call the English stupid because they do not adopt it. But the cord was never put in for the benefit of the passengers in this country, and is almost never used by them, nor do they need any means of communicating with the train-men. There is one at the end of each car, whom they may go to, and if anything is wrong, he is more likely to observe it than any passenger. And as for danger from fellow-passengers, that is eliminated wherever there is a car-load of them together, just as a man (or a woman) is safer in a party of a dozen or two than when shut up with only two or three. But when you put a bell cord through English cars, you put it out of reach of the train-men and only accessible to the passengers, who cannot reach a train-man without stopping the train. The circumstances are very different with the two kinds of trains.

10. So do we. What we call a "caboose" is the car placed at the tail of a freight train to serve as an office for the conductor, carry tools, etc.

11. The "truck" is, however, decidedly the distinguishing feature of the American railroad system, what has made it possible to construct our roads cheaply, with irregular "surface," and with curves known nowhere else in the world. (On one of the elevated railroads 800 trains daily run through curves of ninety feet radius.) Probably there are not a dozen roads in America that a European train could run on without getting off the track every day. Whether invented here or elsewhere makes no difference about this, though we may add that the very first locomotive built in America had trucks.

12. Our engines with trucks that run at the highest speed (and there are a very few that run at fast English express speed) show no signs of getting upset by their trucks swiveling round like a castor.

13. This is doubtless perfectly true. As we have said before, the narrow-minded man is apt to condemn everything that does not suit him, forgetting that every public institution is, or should be, made to suit the great mass of its customers. On the whole every country's railroad system is made to suit the conditions of that country—its likes and dislikes, its customs and prejudices. And, in an old country especially, the public resents changes, and a very great improvement, which in time would universally be recognized as such, might likely enough be received with general opposition simply because the public is unaccustomed to it. Railroads, like merchants, have to cater to bad tastes as well as good, and to stupidity and prejudice—they have to give or try to give people what they want. That the English travelers do not want what we do may surprise us, but it is no reason for substituting American for English practices.—EDITOR RAILROAD GAZETTE.]

Errata in "The Best Position of the Centre of Gravity of Locomotives."

TO THE EDITOR OF THE RAILROAD GAZETTE: It would be unprofitable to inquire here whether the errors which occurred in the article on the above subject which you

published last week were the fault of the copyist, printer or proof-reader. So long as they occurred, it only remains for me to correct them. Will you therefore oblige me by republishing the following paragraphs with the corrected formulae?

For the purpose of comparison with the results of observation, mathematical formulae may here be deduced, first finding a formula for insistent weights upon the rails and investigating the effect of the height of the centre of gravity upon super-elevation of the outer rail, referring for this purpose to fig. 7, in which G is the centre of gravity, a the angle of the road-bed, W the weight, C the centrifugal force, R and R' the insistent weights on the wheels. Whatever the super-elevation may be, C , W , R and R' must be in equilibrium, and, by using the moments and solving for R and R' , we find as follows:

$$(1) R = \frac{1}{2D} [W(D \cos. a + h \sin. a) - C(h \cos. a - D \sin. a)]$$

$$(2) R' = \frac{1}{2D} [W(D \cos. a - h \sin. a) + C(h \cos. a + D \sin. a)]$$

in which h is the height of the centre of gravity upon a perpendicular to the wheel-base, and D is the semi-gauge.

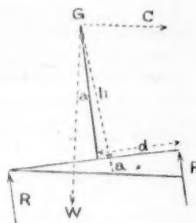


FIG. 7.

If the super-elevation is the proper one, $C = W \tan. a$. By substituting this in (1) and (2), it is found that $R = R' = \frac{W}{2 \cos. a}$.

Taking (1) and solving for h and substituting the values of R and C , there results:

$$(3) h = \frac{D \cos. a + D \tan. a \sin. a - \frac{D'}{\cos. a}}{W \tan. a \cos. a - W \sin. a} = \frac{D(\cos. a + \sin. a) - D'}{(\sin. a - \cos. a) \cos. a}$$

h is therefore indeterminate, or in other words, a change in height of the centre of gravity does not disturb the formula for determining super-elevation.

The value of the centrifugal force is:

$$(4) C = \frac{W V^2}{g r}$$

and if the centre of gravity is raised, r becomes r' , which is less than r . The centrifugal force then becomes:

$$(5) C' = \frac{W V^2}{g r'} = \frac{W V^2}{g r} \times \frac{r}{r'}$$

The first part of (5) is equal to the value of C , the second part, $\frac{r}{r'}$, is less than one; hence:

$$C' < C.$$

F. C. WOOTEN.

Western Railroad Association—Annual Report.

The Executive Committee of the Western Railroad Association submits the following annual report for the fiscal year ending Dec. 31, 1880, with congratulations to the members upon the success which has attended its affairs during the year in every particular, and especially upon the harmony both of purpose and of action which has obtained, the opinions given and the recommendations made having been followed, so far as we know, in every instance, and with advantageous results.

While the Association is purely mutual in its organization, and without corporate powers, its work is felt to be a necessity, and its influence, as well as its membership, have grown each year since its reorganization in 1874. Originally organized with the single purpose of defending some important litigation then already commenced, in which quite a number of railroad companies were interested, the companies composing the Association now refer to it all patent litigation commenced and all patent claims preferred. It does not determine the mechanical merits of improvements. The questions of patent liability incurred or to be incurred by the use, change or purchase of patentable devices are the questions which the Association assumes to determine, and they are questions of primary importance.

One of the standing rules of the Association is, that no new device, appliance, or process shall be introduced, and no change made in those already in use without a prior examination as to what possible patent liability may be incurred thereby. If there has been in years past a disposition on the part of any of the members to disregard patent property in all instances and to recognize the same only when forced to do so by a decree of court, this disposition has entirely passed away and has been succeeded by a desire to encourage invention in all proper ways, to respect all legal patent rights, and to avoid difficulties of infringement by ascertaining in advance what property rights exist under the patent laws upon any device or combination proposed to be introduced, and by purchasing full rights thereunder in advance. While through inadvertence and a misunderstanding of the rule by the officers of some of the railroads and opinions are not made in every instance, they are growing more frequent each month, and it is matter for congratulation that the rule is adhered to as uniformly as it is, and that the recommendations made to the members in this regard have been followed, so far as we know, in every instance.

These annual reports have frequently contained suggestions as to the necessity of encouraging invention by railroad employees in all proper ways. Continual improvement in the mechanical departments, for the purposes of economy, and the reduction of rates, is a necessity. It is to the interest of the railroad companies that all improvements made should be patented immediately by the proper parties for the protection of the railroad companies. Not now repeating the many reasons which have been given heretofore in these annual reports concerning the above points, we respectfully recommend that the following rules shall be strictly and uniformly carried out:

First. That all employees shall be encouraged to make and suggest improvements under the supervision of the heads of the respective departments; but that no change whatever shall be either experimented with or introduced without the consent of that officer of the company who is the correspondent of this Association.

Second. If the improvement made or suggested shall commend itself to that officer, he shall submit the same with a model thereof immediately to the Association, with a request for a report as to whether the same or any part thereof be patentable, and as to whether the use of the improvement in part, or as a whole, would infringe any existing patent. This examination and report will be made without any other expense to the company making the request than the cost of a model of the improvement. We are forced to require this model in every instance for many reasons, and especially insist that the model shall be in strict accordance with the device as it is proposed to be introduced. It has not infrequently happened that a fraud has been perpetrated by submitting a patent to the Association for an opinion when the patentee intended to introduce a modified device to which the opinion given would not be applicable, and in some cases models have been submitted, and changes subsequently made in the device without submitting the changes so made for an additional examination.

Third. If it appear that the improvement, or any part thereof, be patentable, the railroad company whose employee makes the same, should for him, and through proper parties, take out the patent, paying the expenses thereof, the patentee (employee) in consideration thereof to execute to the railroad company a full and complete release and license, but otherwise retaining the title to the improvement. Great care should be exercised in selecting the solicitor to prepare the applications for such patents, for there are many solicitors of patents offering to do work of that kind for very small fees, who are wholly unqualified for the business. It is well known that a majority of the patents issued from the Patent Office are either insufficient, inoperative or invalid. The following facts are significant in this connection:

The United States Patent Office has issued 165,893 patents since 1865, or an average of 11,842 per annum for 16 years, there being on the 1st of December, 1880, 197,793 letters patent still alive.

During the year 510 opinions have been given: 78 new letters patent have been reported upon; 89 suits have been defended; claims aggregating an alleged liability on the part of the members of over \$5,000,000 have been settled; 15 companies have joined the Association; nearly 4,000 letters have been written; 16 applications for the extension of letters patent by Congress have been defeated, and some important precedents concerning the questions of the liability of manufacturers to their vendees for patent royalties paid by the latter have been established—the expenses of the year being \$343.59 less than for any year since the reorganization in 1874, and \$907.23 less than for the year 1879.

Membership.—The following fifteen companies have joined the Association during the year:

Alabama Great Southern.
Charleston & Savannah.
Chicago & Grand Trunk.
Cincinnati, Indianapolis, St. Louis & Chicago.
Denver & Rio Grande.
Detroit & Bay City.
Illinois Midland.
Lake Erie & Western.
Louisville, Cincinnati & Lexington.
Louisville, New Albany & Chicago.
Ohio Central.
Pittsburgh & Lake Erie.
Port Royal & Augusta.
Savannah, Florida & Western.
Scioto Valley.

The list of members for the ensuing year will show a considerably less number than the list for last year, on account of an unusual number of consolidations.

[Twenty four lines are mentioned which will remain in the Association but will not appear upon its list for the reason given above.]

The Central Railroad of Iowa was dropped at the commencement of the year for non-payment of assessment, and the Kansas Pacific Railway was withdrawn from the Association at the time of its consolidation with the Union Pacific Railroad Company, the latter company never having been a member.

Officers.—In January last the Association moved into very convenient and commodious offices, Rooms 62, 63, 64 and 65 of the Honor Buildings, corner of Adams and Dearborn streets, Chicago. The Western Society of Engineers occupy the directors' room for their monthly meetings.

The Association has accumulated a collection of models which is well worth the examination of every railroad official. It is intended that at no distant day the model room shall contain a model of all the recent improvements which have been successfully introduced. We do not contemplate any expenditure by the Association for this purpose, but the result will follow from an adherence to the rule above cited as to furnishing models with requests for opinions.

Bureau of Patents.—It is generally true that all improvements of any value whatever are patented. He, therefore, who would ascertain the best-known device in any art, should first examine all the patents which have been heretofore granted in that art and notice their successes and failures and the lines along which invention in that art has traveled. A partial collection has been made of all the patents granted by the United States since 1867, in classes pertaining to railroads, and the same have been classified and filed in the Secretary's office. This collection is not complete, but soon will be, and even now it would be profitable for every manager to examine the same whenever he has a mechanical question of any importance to determine. We hope that the model room and this bureau of patents will be more frequently examined by railroad officials. They are open to inspection during all business hours to any officer or employee of any road which is a member of this Association.

THE LIABILITY OF MANUFACTURERS AND SUPPLY AGENTS TO RAILROAD COMPANIES FOR PATENT ROYALTIES.

In 1877, and subsequently, the Executive Committee of this Association, for the purpose of legally determining to what extent and under what circumstances manufacturers and supply agents were liable to railroad companies for patent royalties paid by the latter on account of devices furnished by the former, proposed to several parties to make agreed cases upon this question, and as an inducement thereto offered to pay all the expenses of such litigation except the fees of opposing counsel, and to stipulate in advance that if the manufacturer was unsuccessful he should repay only 50 per cent. of the royalties paid by the railroad companies in the matter sued upon. These efforts being unsuccessful, the annual report for 1877 contained in substance the three rules reprinted below, and the annual reports for 1878 and 1879 contained the recommendation that the members of the Association should take this matter into their own hands and determine the same by discriminations in the distribution of patronage and contracts. We have been unable for manifest reasons to commence regular suits which would determine these questions. The members of the Association, however, and the manufacturers and supply agents who have been concerned in the claims which have been made during the year and their attorneys have been invited to criticize these rules. The results of the correspondence and the conferences had confirmed the opinion that the following rules are in accordance with established usage or the equities of the matter, viz.:

First. That if the railroad company specify any article by its patented name, the manufacturer may take it for granted that the railroad company has the right to use the same and that the manufacturer will be protected by the railroad company in the manufacture. This has been settled by custom, and in such cases the manufacturer will hold the railroad company justly liable, though perhaps he could not legally, unless it be specially provided in the contract that the right to make and use the articles so named shall be purchased by the manufacturer as a part of his contract.

Second. If the manufacturer desires to introduce an element or device into the car or locomotive which is not specified, and which forms a part of his standard, and concerning the patent relations of which he is in doubt, he may, through the company giving the order, refer the question to this Association, which will give to the company and to him safe advice in the premises, but

Third. If the manufacturer, without any advice to or from the Association or the company, and entirely on his own motion and without any specification therefore from the railroad company, puts into the car or locomotive a device against which a patent claim is subsequently made, we propose that the manufacturer shall, according as it may be determined by the Association, either settle the claim or pay the expenses of a defense to the claim, which defense shall be conducted by the Association, if it so determine.

The above propositions have not been, and we believe they cannot be, reasonably objected to by the manufacturers and supply agents of railroad devices and appliances. Pursuant thereto, and to a general belief that the members of the Association would uniformly act in accordance therewith, we have been able to establish several precedents during the year in this regard, and have made several equitable and very advantageous settlements.

The questions of liability, as between the manufacturers and the railroad companies, for infringements of patents herein referred to, are involved in great uncertainty. We believe that they can be equitably settled without resorting to litigation. It is, of course, far preferable that these questions should, if possible, be determined without legal controversies. To secure adjudications by the court of last resort, which would authoritatively settle the questions involved in the three comprehensive rules reprinted above, would require many cases and a long litigation. To determine these questions without litigation requires concert of action by the railroad companies.

It seems, therefore, both possible and proper that these questions be determined by and through this Association, in accordance with the above rules, until it shall be demonstrated that they are insufficient or inequitable. We are also confident that nearly, if not quite, all the manufacturers and supply agents, acknowledging the fairness which has characterized the administration of the affairs of the Association, will accept its determination of these questions under these rules; and we are sure that that will be the result, if the members of the Association will uniformly acquiesce in the recommendation which we repeat, viz. that they shall buy their supplies of those who will protect them in the use thereof, and will not, under any circumstances, purchase either from those who do not furnish this protection, or from those who we find have not the right to furnish the articles offered.

SETTLEMENTS.

While the officers of the Association do not as a rule negotiate in advance the right to use patented articles, but only assume to advise under how many and what patents license fees should be paid in each instance, still every claim based upon an alleged infringement, and where alleged damages have already accrued, should be immediately referred to the Association for an opinion as to whether the claim should be settled or litigated. If the claim be refused, in a very large number of cases that is the last that is heard of it. But if litigation is commenced under a claim so refused the litigation should be immediately referred to and conducted by and at expense of the Association. If an examination shows that the claim should be adjusted, the officers of the Association will report accordingly to the company interested and upon its request will negotiate a settlement thereof. If such advice be given and the claim still be refused by the company against which it is made and litigation ensues, the Association will not defend the suit.

Among the more important settlements which have been made by the officers of the Association, the following are worthy of special mention:

Williams Head-light.—Referring to the last annual report, page 10, we ascertained early in the year, by circular letter, that the liability of the members of this Association, under the patent granted April 29, 1862, to Irvin A. Williams, No. 35,122, estimated upon the basis of the findings in the litigation which had continued for 18 years under this patent, was about \$4,000,000, and further that a considerable number of the manufacturers of the head-lights, which had been in use in this Association during the life of this patent, were either insolvent or had retired from the business. A proposition was obtained from Mr. Williams to release all his claims against the members of the Eastern and the Western Railroad Associations for the sum of \$50,000. After repeated meetings with the manufacturers of head-lights and head-light burners named below, the Secretary of this Association, having also authority to act in this matter for the Eastern Railroad Association, an arrangement was effected by which these manufacturers should pay 75 per cent., or \$37,500, of the settlement price, thereby acknowledging their equitable liability to the railroad companies in this regard, and they to organize an association, one of the objects of which should be to avoid such difficulties of infringement in the future; and the members of the two associations concerned to pay 25 per cent., or \$12,500. The latter amount was divided between the two Associations, members of the Eastern Association paying \$5,140, and members of this Association paying \$7,360, the officers of the two Associations agreeing to recommend to the members thereof to give preference in future purchases of head-lights and head-light burners to the manufacturers who consummated this settlement, and to the patentee whose concessions had made it possible; prices and quality of material being given reasona-

ble consideration. The settlement has been consummated, and there is on file a full release covering the liability of about \$4,000,000 mentioned above, for the benefit of all the railroad companies, members of this Association at the date thereof, viz.: Nov. 10, 1880. We desire to repeat the recommendation to the members contemplated by the terms of the agreement just referred to and contained in the circular letter of the Secretary issued under date of Nov. 17, 1880, and we therefore name the following manufacturers as having joined in this settlement, and as entitled to preference in the purchase hereafter of head-lights and head-light burners:

Irwin A. Williams, Utica, N. Y.
The Buffalo Steam Gauge & Lantern Co., Rochester, N. Y.
Post & Company, Cincinnati, Ohio.
The St. Louis Railway Supplies Manufacturing Co., St. Louis, Mo.
The Adams & Westlake Manufacturing Co., Chicago.
M. M. Buck & Co., St. Louis, Mo.
The Kelley Lamp Company, Rochester, N. Y.
E. L. Hall, Philadelphia, Penna.

Injectors.—In an adjudication in the United States Circuit Court for the Southern District of New York, between Messrs. Nathan & Dreyfus of New York, the owners of Letters Patent No. 57,057, granted to James Gresham, August 7, 1866, and the Rue Manufacturing Company of Philadelphia, the manufacturers of the "Little Giant" injector, of which a large number were in use in this Association, the Gresham patent was declared to be valid, and the "Little Giant" injector to be an infringement thereof. At our suggestion, and pursuant to the rules above laid down, a settlement of that case was consummated by the Rue Manufacturing Company, through whom, and at whose expense, but without expense to the members of this Association, the latter received a full release for all liability incurred prior to the date thereof on account of the use of "Little Giant" injectors, and a license to continue the use of any such injectors at that date on hand. But the members of the Association did not thereby acquire the right to purchase injectors made in accordance with the Gresham patent from anybody but Messrs. Nathan & Dreyfus, the owners thereof, the Rue Manufacturing Company discontinuing the use of said improvements and substituting therefor another living attachment.

Continuous Draw Bar.—Some years since, at the advice of our General Counsel, the parties owning the Griffith and Patterson patent No. 167,333, granted Aug. 31, 1875, and the parties owning the Middleton patent No. 142,492, granted Sept. 2, 1873, settled the controversy between them by assigning their patents to the Continuous Draw Bar Co. It was, however, then and subsequently claimed that the continuous draw bars purchased from this company were infringements of the patent granted Dec. 3, 1867, No. 71,590, to Edward L. Caum. During the year at our suggestion the Continuous Draw Bar Co. purchased the Caum patent, the assignment thereof containing a full release for all liability thereunder theretofore incurred by railroad companies, which, so far as we are aware, settles all controversies pertaining to this device.

Fire Brick Arch.—Early in the year the testimony of Gordon H. Nott, M. E., was taken as to the early use of brick arches and water legs in locomotive fire boxes. The developments of the facts through his testimony induced the owners of the Griggs patent to accept a comparatively nominal amount in settlement of the last case pending under that patent.

Brake Shoes.—Claims were made simultaneously against 34 members of the Association for the infringement of letters patent upon brake shoes No. 40,156, granted to James Bing, Oct. 6, 1863 (expired Oct. 6, 1880); No. 58,207, granted James Bing, Sept. 25, 1863; No. 41,114, granted to Joseph Wood, Jan. 5, 1864, and No. 45,103, granted to Joseph Wood, Nov. 15, 1864. These patents in the form in which they were issued were very narrow in their scope, and the question of infringement was attended in each case with considerable nicety and difficulty; and the question of the validity of these patents was attended with so great doubt that the claims made thereunder presented proper subjects matter for general compromise. It was claimed by the company which owns these patents that a license fee of \$5 per car had been established. A considerable number of settlements have been made with railroad companies of the East upon a basis of \$3 per car. An agreement has been made between the National Car Brake Shoe Co. and this Association, by which in cases where infringement is admitted by the General Counsel of the Association the Executive Committee will advise an immediate settlement upon the basis of \$1 per car; and where the infringement is denied agreed cases shall be prosecuted with as little delay and expense as possible, each party paying their own costs, and if the claimants are successful then settlement therefor shall be made at the said rate of \$1 per car. Where infringement has been admitted settlements have been made accordingly, but the larger part in number and amount of the claims made for infringement under these patents was disputed by our General Counsel, and agreed cases concerning the same are now pending.

Relying upon the acquiescence of the members of the Association in the recommendations of its officers, a number of settlements have been made during the year with the owners of patents, which have been adjudged by the courts to be valid, in consideration of the issuance of a circular letter to all the members admitting the validity of said patents, and advising the railroad companies not thereafter to use devices covered by such patents without license rights, or unless the same were purchased from the owners or licensees of such patents. Several such settlements have been consummated during the year under patents, which have been heretofore inadvertently infringed by the members of the Association to a very considerable extent. The releases which have been obtained in these instances also contain a license to the members of the Association to continue the use of any and all infringing devices in use or in stock at the date of the release, but do not authorize further purchases, without rights, of additional equipment which would infringe the patents.

CONGRESSIONAL.

No efforts have been made during the year to secure a revision of the patent laws by Congress, although our correspondence during the year has disclosed many additional instances of the absurdity and injustice of some of the present provisions of the patent law. Sixteen applications for the extension of railroad patents by Congress have, during the year, been defeated, partially or wholly by our efforts. Desiring to be just and to err, if at all, upon the side of liberality, we have in some instances declined to object to the extension of patents for meritorious inventions which, through no fault of the patentees or their assignees, have failed to bring them any reward for such inventions; but such applications have not been successful and no patent affecting the railway interests has been extended by Congress during the year.

Application was made to Congress for the extension of the patent granted to Col. Ezra Miller, March 31, 1863, No. 38,057—the first of the three patents under which the well-known Miller coupler, buffer and platform was introduced. An appearance was entered before the Committee on

Patents of the House of Representatives in opposition to the extension, but was mislaid, and inadvertently the case was taken up and the application was approved by the committee by almost a unanimous vote without any opposition thereto being heard. Upon application, however, the case was opened and a rehearing had, which resulted in a decided vote against the extension. This patent includes a number of variations in car couplers, but the only element in the patent which forms a part of the "Miller Coupler, etc." is a hook bevelled on both sides. This patent expired March 31, 1880, and Col. Miller's other patents, covering the patented features of his platform and coupling arrangement, will expire respectively Jan. 31, 1882, and July 21, 1883.

There was no serious effort made in Congress in favor of a bill for the appointment of a commission by the government to determine what improvements should be adopted by transportation companies, and upon what terms, etc., etc., and we think there is no danger that the absurd propositions of this bill will ever be enacted by Congress.

The bill referred to in our last annual report providing that all patents at any time heretofore granted may be extended for the further term of eight years, etc., was without difficulty defeated in the committee to which it was referred.

LITIGATION.

Under this head the condition of a number of suits is given, which we summarize. In the Tanner brake cases there is no change, except that two of the suits have been dismissed at plaintiff's costs.

In the swage-block cases two suits have been settled; two others are before the United States Supreme Court on a question as to the measure of damages.

In the Hodge brake suits there has been no change. The Stevens brake suit has been dismissed. The Williams head-light suits have been settled as noted above. The Griggs brick-arch suit against the Central Pacific has been finally settled. Other cases are noted by the report as follows:

The Herrick Wrecking Car.—In the only suit under this patent, viz.: that vs. The Western & Atlantic Railway Company, the evidence is all in, and the case is ready for hearing. When heard, we confidently expect a decision in favor of the defendant.

The Barker & Thomas Grain Door.—In the test suit under this patent vs. The Chicago, Rock Island & Pacific Railroad Company, evidence has been taken for the defendant showing the use of edgewise moving grain doors, supported on a pivot at the lower corner, on the Ogdensburg & Lake Champlain Railroad before the date of said invention, which we believe effectually disposes of all claims under this patent.

The Tracey Switch.—In the first suit under this patent, against the Chicago & Alton Railroad Company, evidence was taken showing the prior use of a switch substantially the same as the Tracey, years prior to his alleged invention. Plaintiff's attorney thereupon admitted the invalidity of the patent, and that suit was dismissed. A second suit, however, against the same defendant, was afterwards brought by another attorney, and the question will have to be determined by the courts. We entertain no doubt that the evidence just referred to, unless successfully contradicted, is sufficient to defeat this patent.

Kirby's Feed Water Heater.—A suit under this patent was commenced some years since against the Terre Haute & Indianapolis Railroad Company. Evidence has been taken on both sides, but nothing further has been done in the case during the past year.

Gardner & Hanson Coupling.—The suit under this patent now pending against the Lake Shore & Michigan Southern Railway Company, at Cleveland, will probably be heard some time in January. The device in question is the coupling in general use for connecting the air pipes of the Westinghouse brake, and is confidently claimed to be no infringement of the patent in question.

Hayes' Flue Joint.—The former suit under this patent against the Chicago, Rock Island & Pacific Railroad Company was disposed of by the plaintiff taking a non-suit on the ground of his failure to make out his title to recover for damages during the period covered by the alleged infringement. Since then a second suit has been commenced against the Chicago & Alton Railroad Company, but nothing has yet been done beyond filing the pleadings. The evidence of prior invention now in our possession is believed to be sufficient to defeat the patent.

Brake Shoes.—Claims have been made by the National Car Brake Shoe Co., during the past year, against some seventy of our companies for the alleged infringement of the Bing and Wood patents hereinabove referred to. The first of these patents, which is by far the most important, is for a brake shoe having the sole attached to the body of the shoe so loosely as to permit the sole to rock sideways upon the shoe so as to accommodate itself to the level of the wheel. All roads using that mode of construction have been advised to settle on the terms arranged, viz.: \$1 per car or locomotive tender (most of them, if not all, have already done so). It is claimed, however, that brake shoes constructed in other respects according to this patent, but without the rocking motion, are also infringements, and this is the view taken by the Circuit Court for the Northern District of Illinois in the test suit brought to determine this question against the Lake Shore & Michigan Southern Railway Company. An appeal was taken from this decision to the Supreme Court and the case submitted on printed briefs in hopes of thereby obtaining a speedy determination, but the submission having been set aside by the Court and the case continued for oral argument, a decision can now be expected for at least three years. If decided in favor of the defendant, it will practically settle the question as to all roads using the same shoe; if decided in favor of the plaintiff, those roads can still settle at the rate of \$1 per infringing car and locomotive tender, as detailed above.

In another suit by the National Car Brake Shoe Co., under the same patent, against the Detroit, Lansing & Northern Railroad Company, it was held by Brown, J., that the shoe used by the defendant, in which the sole was attached to the shoe by two curved or hook-shaped lugs, was not an infringement, and the bill was accordingly dismissed.

Other test suits under the same patent are now pending against the Chicago & Alton and the Great Western companies for the purpose of settling other questions of infringement, but in neither of these have any proceedings yet been had.

Sleeping Car Patents.—In 1878, the case of the Pullman Palace Car Company, et al., vs. the Barney & Smith Manufacturing Company, et al., the Chicago, Milwaukee & St. Paul Railway Company and the Wagner Sleeping Car Company being the real defendants, was abandoned by the plaintiffs, since which time nothing has been done in that case. A more recent case under the Pullman patents was commenced against the Baltimore & Ohio Railroad Company. A motion for a preliminary injunction has been fully argued in this latter case and an injunction has been refused by the Court.

Costs.—In June last the question was raised whether the defendant or the Association should pay the complainant's costs taxed in a suit determined against the defendant in the Supreme Court, which suit, however, was commenced prior to the amendment adopted Jan. 11, 1876, to Article

IX. of the constitution. At a full meeting of your Executive Committee, held May 6, it was unanimously resolved that this amendment was but explanatory and declaratory of the rule as it had theretofore existed, and that as now laid down in the said article all such costs should be paid by the defendant company and not by the Association, and, too, without any reference to the date when the defense of such suit was assumed by the Association.

In a case where the validity of a patent, under which claim was made, was admitted, but in which infringement was denied, in which case a large number of the members of this Association were directly interested, it being an agreed case to be determined solely on the question of infringement, the question was incidentally raised whether the suit being commenced by virtue of an agreement with the officers of the Association as an agreed case, in the event of the claimants being successful, the Association or the defendant company should pay the costs. The question whether the individual member of the Association sued or the Association itself should pay the costs, assumes such different phases in different cases, that we are of opinion that a discretionary power should be given to the Executive Committee to pay any costs in any case defended by the Association, out of its treasury, and, therefore, the following amendment to Article IX. of the Constitution is respectfully submitted, it being contemplated that the article as it now stands shall constitute the rule, and that the power thus conferred upon the Executive Committee shall be exercised only in exceptional cases.

Amend Article IX. by adding at the end thereof the following:

Provided, That in exceptional cases the Executive Committee by a unanimous vote of the members present at any meeting may pay any costs in any litigation involving the interests of members of the Association out of its treasury.

The following list shows the cases pending Dec. 31, 1880: [Here follows a list of three cases pending in the United States Supreme Court, and 75 in Circuit Courts. Another list gives 15 cases finally settled during the year.]

FINANCIAL.

The Treasurer's report for 1880 is as follows:

Balance from 1879.....	\$5,803.33
Rent of old offices.....	50.00
Received from sixteenth assessment, as ordered.....	27,268.18
" " assessments of new members.....	416.78
Total.....	\$33,528.29
Authorized disbursements.....	25,834.27

Cash balance, Dec. 31 (of which \$500 is in incidental fund).....\$7,705.02

The Treasurer's accounts and vouchers for the fiscal year ending Dec. 31, 1879, which were referred to this committee at the last annual meeting, were examined and found to be true, full and correct.

Application was made for membership in the Association during the year by a railroad company which had just completed and was about to commence the operation of a part of its proposed road, which circumstance called attention to the fact that the Constitution and By-Laws of the Association made no provision for the assessment of such a company. On account of the number of railroads which have been projected during the year, a number of such applications may be made during the ensuing year, and we recommend the adoption of the following amendment to Article VI. of the Constitution:

Amend Article VI. of the Constitution by adding at the end thereof the following:

Provided, That railroad companies, members of this Association, whose lines at the time of joining have not been operated for one year, shall be assessed upon the basis of one dollar per mile built until the operations of the company shall permit of an assessment as hereinabove provided.

Respectfully submitted,

B. F. AYER,
T. F. WITHERS,
B. C. COOK,
J. M. WALKER,
A. L. OSBORN,
Executive Committee.

The Proposed New Bridge Over the Douro.

The following description, with the accompanying illustrations, we copy from *Engineering*:

We have already referred to the new bridge which it is intended should be erected over the Douro to join the city of Oporto with Villanova de Gaia, and the contract for the construction of which was opened to public competition some time since. The work is not only of considerable magnitude, but presents peculiar features in its general design and mode of erection. It is to be, necessarily, in one span, and will have to be, almost necessarily, erected without scaffolding. The width of the river at the point of crossing is 525 ft., so that when completed the arch, if an arched design be decided upon, will be the largest yet attempted, as the clear span will have to be at least 560 ft., or 35 ft. wider than the Maria Pia Bridge, erected some time since by M. Eiffel & Co., of Paris. Moreover, the design has to provide for two roadways, one 39 ft. above the level of the water, and the other 197 ft. above, the widths being respectively 19 ft. 6 in. and 26 ft.; the object of these two platforms is to connect the higher parts of Oporto and Villanova, as well as the river bank on the lower land. Ten different designs were submitted to the Bridge Commission at Oporto on the 12th of November last. Each scheme was numbered, and presented to the Commission in the order of its number. We reproduce sketches showing the general outline of the respective designs, with some general particulars of each, from *Le Génie Civil*.

1. The first design submitted was that of the Société de Construction des Batignolles. The principal feature is a large arch 22 ft. 11½ in. deep at the springing and 26 ft. 3 in. at the centre, where the upper member rises above the level of the horizontal girder carrying the upper roadway. The top and bottom booms of the arch are connected by single intersection lattice bars, one set of which are all vertical, and the others inclined parallel to each other from the springing to the centre. The towers adjacent to the arch are of iron, resting on masonry piers from which the arch springs. The upper horizontal girders rest on columns supported by the arch, and the lower roadway is suspended at six points as indicated in the diagram. The contract price for this design is £95,902.

2. This second design was presented by the Société Internationale de Construction de Braine-le-Comte (M. Rolin & Co.). The chief feature is an enormous bowstring girder 131 ft. deep, divided into six panels braced with single intersections. The lower roadway is carried on the bottom of this girder, and the upper by a horizontal girder supported by extensions of the vertical members of the panels of the bowstring. The design is inelegant, but the price is moderate, being £75,300.

3. This design was submitted by the Creusot Company, and bears some resemblance to that just referred to, but is in all respects a more elegant structure. It alone, of all the ten projects, is constructed wholly of steel. The lower por-

tion of the structure consists of open girders with curved upper members; they are 99 ft. 4 in. deep at the end, and 65 ft. 7 in. deep in the middle. The horizontal girder carrying the top roadway, is divided into spans of nearly 100 ft. by the vertical standards rising from the top of the lower girder, which is divided into the 12 panels filled with single intersection bracing. Special provision is made for protecting the lower part of the structure against the action of the wind. Amount of estimate, £67,600.

4. Messrs. Handyside & Co., of Derby, presented the fourth design, prepared by Mr. An Eade, of Westminster, and which presents some of the characteristics of the viaducts designed by the same engineer for the Costa Rica Railway. The arch is in two parts joined in the centre, the form of the curve being slightly ogival. The extrados consists of a horizontal line nearly coinciding with that of the upper roadway, and two inclined lines meeting the former nearly midway between the piers and the centre; the system of bracing is indicated in the sketch, which also shows the arrangement of the smaller spans of the upper portion, which are framed up with the piers. The two principal of these are wider at the base than at the top; the others decrease in width towards the masonry pedestals. The lower roadway is suspended from the arch by a number of rods. Transversely the whole structure is widened towards the lower part to increase its stability. The estimated cost is £81,200.

5. M. Lecoq & Co., of Hais, Belgium, submitted a curious design which is indicated in the sketch; it is a combination

39 ft. 4 in. and 26 ft. 3 in. respectively. The two girders forming it are caused to diverge towards the abutments which carry the main piers of the bridge. The upper girder, parallel throughout, is tangential to the top of the arch, and is supported by it only at three places as indicated. The lower girders are suspended by four systems braced together transversely. These girders, which are parallel, are articulated one to the other in such a way as to receive the advantages of a continuous girder without the difficulty arising from the deflection of the arch and consequent distortion of the lower structure. Price £82,000.

10. Of this design, presented by MM. J. F. Cail & Co., it is only necessary to say that it is an exact copy of the existing Maria Pia Bridge, with the addition of the lower suspended roadway, and that the estimate amounts to £61,212.

Rail Specifications in Europe.

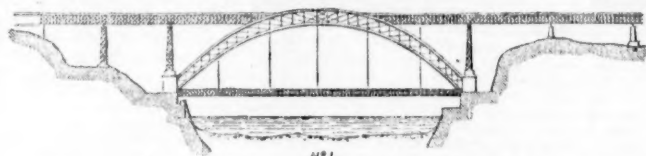
[From a paper on Rail Specifications and Rail Inspection in Europe, by P. Sandberg, C. E., of London, read at the Lake Superior Meeting of the American Institute of Mining Engineers, August, 1880.]

Sandberg's Standard Sections of Iron Rails.—I have had principally to inspect the flange or flat-bottomed sections, which are used everywhere and are almost universally adopted except in England. After ten years' experience I was led to design my normal or standard sections from considering the enormous waste of time and money caused by

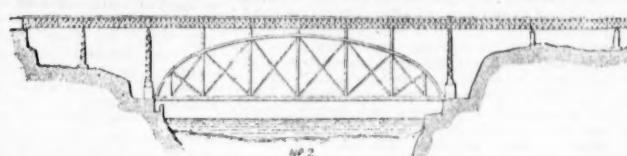
happily, with the ordinary form of fish we can only obtain, even with the best fish angle and strongest bolts, one-quarter or one-third of the stiffness of the joint compared with that of the middle of the solid rail. It therefore matters little if we increase the stiffness of the solid rail by the increased height, as it is already stiff enough for any engine to run upon, compared with the weakness of the joints; and the result is generally seen in flattened rail-ends and sunken joints where they are laid on supported or on suspended sleepers.

Sandberg's Standard Sections of Steel Rails.—With the use of the new material—steel—rail sections can be rolled easier with thinner flanges; moreover, they are not apt to laminate from imperfect welding, like the iron. Notwithstanding the general adoption of the iron sections already in use, this new metal caused a demand for improved sections of steel rails. Although confusion might be caused by the publication of a new set of standard sections, I yet found myself bound to design such sections. I published them in 1878, keeping them to what I had designed and executed in large quantities for government and private railways. It would undoubtedly have been best theoretically to adhere to the main dimensions of rails and to the same forms of fish plates, and only to reduce the sections in flanges and web as much as the facility in working the metal steel compared with iron would allow. Against this plan, however, is to be set the inconvenience, from a commercial point of view, of interfering with the adopted weight. For instance, for 50 lbs. and 56 lbs. iron rails per yard, rail

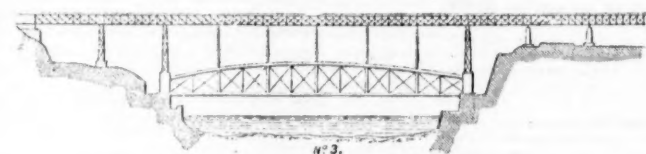
COMPETITION DESIGNS FOR THE NEW BRIDGE OVER THE RIVER DOURO, AT OPORTO



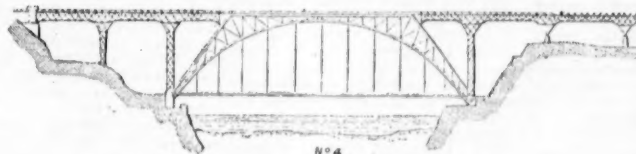
No. 1. SOCIÉTÉ DE CONSTRUCTION DES BATIGNOLLES, PARIS.



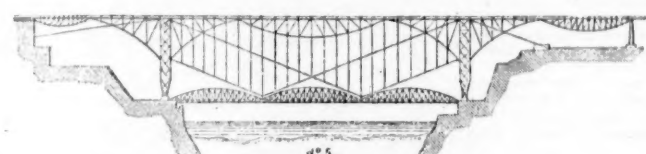
No. 2. MM. ROLIN AND CO., BRAINE-LE-COMTE.



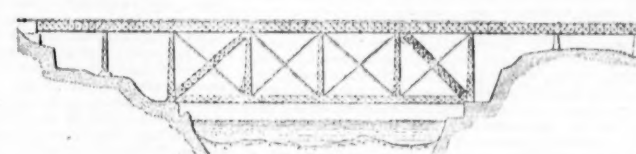
No. 3. MM. SCHNEIDER AND CO., CREUSÔT.



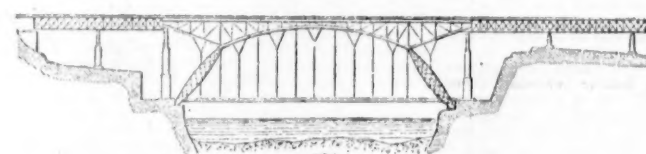
No. 4. MESSRS. HANDYSIDE AND CO., DERBY.



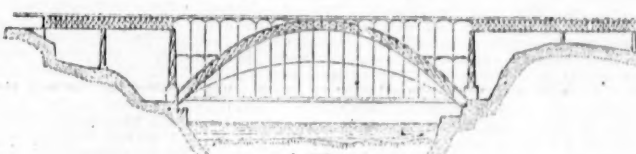
No. 5. MM. LECOQ AND CO., HALS, BELGIUM.



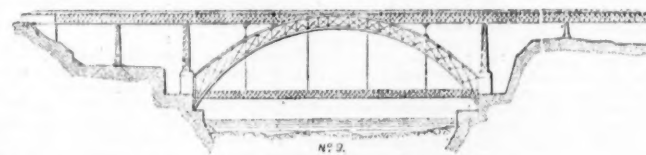
No. 6. LA SOCIÉTÉ DE FIVES-LILLE.



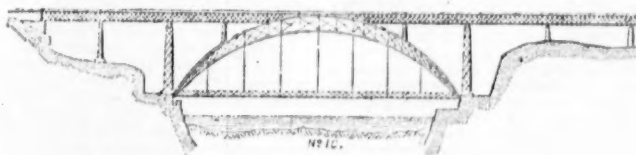
No. 7. MR. JOHN DIXON, LONDON.



No. 8. MM. G. EIFFEL AND CO., PARIS.



No. 9. LA SOCIÉTÉ DE WILLEBROECK.



No. 10. MM. J. F. CAIL AND CO., PARIS.

of cantilever, bowstring, and suspension, somewhat difficult to describe. Price £75,000.

6. This scheme presents in all respects a striking contrast to the preceding, and, of all the designs, is the simplest and most severe. It constitutes an immense parallel girder 157 feet deep, divided into four panels, each 131 feet wide; the top and bottom members of the structure, each forming a very heavy girder, carry the upper and lower roadways. The panels are filled with single intersection bracing, the outer pair of struts being of very large dimensions, and carrying the upper girder down to the abutments. This is, as may be supposed, the cheapest of all the designs submitted, the price being only £48,720.

7. This is Mr. John Dixon's project, and presents several novelties in design. The central arch is reduced by means of two huge inclined struts, resting on the abutments, and on each side the arch is extended in cantilevers to the principal piers, which are tubular, and of wrought iron. One feature of this design is the proposal to erect the inclined struts vertically, and then to lower them to their permanent position shown on the sketch. The assumed cost is £94,540.

8. This and the two succeeding schemes are on similar lines—those suggested by the existing Maria Pia Bridge at Oporto. No. 8 is the design of MM. Eiffel & Co., who built that bridge, and is a very elegant-looking structure. The arch is parallel throughout, and about 13 ft. deep. The girders forming this arch are spread laterally to afford greater stability. The upper roadway is carried by vertical columns resting on the arch and placed at intervals of about 50 ft., small arches being turned between them. The lower roadway is suspended by a number of rods at intervals corresponding to the uprights carrying the upper roadway. Between the latter uprights, and about midway up the arch, is a system of horizontal strutting, and all the columns are thoroughly braced together, the suspension rods, not being braced, however. The piers are of iron, resting on masonry bases. Estimated cost, £70,400.

9. This was designed by M. Seyrig for the Société de Willebroeck, and presents the general features shown in the sketch. The arch is deeper at the ends than in the centre,

the existence of different sections of the same weight, all intended to answer the same purpose. In 1870 I published a set of standard sections and circulated it in America and elsewhere, with the result of its being adopted largely in America, and in England for exportation. In the appendix to this paper I have the pleasure to give the full description of these sections, which were principally made in iron but are now made in steel. I also give the specification which I used, and which seems to have given general satisfaction, inasmuch as none of these rails which have passed under my inspection, so far as I know, have broken, although they have of course had a fair amount of wear and tear. The peculiarities are chiefly equal width of base and height of rail and a good fishing angle, so as to obtain, if not a strong, at least a stiff joint, with ordinary fishing plates; the old pear-shaped forms, although easier to roll, cannot be joined with fish plates so that the bolts do not work loose. For this reason the fishing angle was reduced to a minimum compatible with convenience of rolling, viz., 22 degrees. With the minimum thickness of flange and web the rest of the weight is placed in the rail-head for wear. A medium section was obtained, which was just what makers could easily execute and what railway engineers required; and these are, I think, the reasons for the general adoption of my sections in the market. The prevailing opinion amongst European engineers of these sections is that they are too low and not stiff enough, and that there is an unnecessary amount of width in base. They have, no doubt, reasons for this opinion, as their sections require more stiffness than stability. The weight of their engines is not distributed over so many wheels as in those of American railways; their curves are not so sharp; their roads are better maintained with good ballast, and therefore they can do with less width of base, but they want higher web for the same weight of metal. European rail sections are therefore higher, in proportion to width of base, from $\frac{1}{4}$ in. to 1 in. I am not now speaking of the rails constructed for an iron permanent way—one with long sleepers and cross sleepers of iron or steel—in which case the height is double the width of base. This is quite right, but for ordinary wooden cross-sleepers uniformity of stiffness is what should be aimed at. Yet, un-

makers have their men's wages for rolling arranged to this fixed weight; further, railway engineers calculate the weight and cost of rails per mile to this weight; and I should have had little chance of getting the new sections adopted, even for the construction of new roads, if they had been reduced, for example to 47 lbs. per yard, instead of 50, and to 53 instead of 56. Then for the construction of new roads engineers would say, "Let us have the greatest height (stiffness), width of base (stability), and bulk of rail-head (wearing capacity) which your rolling can produce for the given weight that is established commercially amongst the makers and is adopted by railway contractors." This principle was consequently followed, and new sections for steel were produced of the same weight as the old, viz., 50 and 60 lbs., with greater height than for the iron ones, and with 30 degrees fishing angle for steel, 22 degrees having been found rather too difficult in working. In consequence of having two different Sandberg sections for the same weight some confusion has naturally arisen, and in order to clear up the difficulty, and to explain matters fully, the designs of the two old 50 and 56 lbs. rails published in 1870, as well as those of corresponding weight published in 1878, have been issued in the form of a separate drawing with explanations attached. This drawing has been largely circulated in America and Europe. The rails of the 1878 design have been supplied with angle fishing plates, and, although more costly, these offer greater width of base and stiffness of rail-joint, and they are adopted where localities and circumstances render them applicable. Finally, a series of light sections from 20 to 50 lbs. per yard, for secondary lines or railways of light traffic, were published some ten years ago, and have been adopted both in iron and in steel.

Weight of Rail and Strength of Joint.—The weight of rail ought to be considered, together with the section and with the stiffness of rail, and from the railway engineer's point of view the rail-joint, as being the weakest part, is really the point of prime importance. When contractors, for instance, insert in their specification for building a road that the rail should weigh so many pounds per yard, they would naturally choose a lumpy section, impossible to fish properly, and

offering very little stiffness, so long as they could buy it cheaply. Therefore the stiffness of rail and rail-joint should be considered along with the weight, and I have my description of the Sandberg sections, tabulated the weight of the rail with the stiffness of both rail and rail-joint, and have given the maximum safe load of each engine wheel. For example, the 50 lbs. rail would carry 11 tons on 3 ft. bearings without permanent set, the rail-joint would carry 7.3 tons, and the maximum load of each wheel would be 5½ tons, and the maximum weight of the ordinary goods engine to suit this rail would be 27½ tons. I fully admit that this rule might not always be applicable, varying as it would with local and other circumstances, but it is a simple and practical means of making sure that the rail is not overloaded, and more particularly the rail-joint, for I have often found that the latter is the case in ordinary practice. On the continent of Europe, for instance, a 66 lbs. rail would generally carry 16 tons in the middle of the rail on 3-ft. bearings, but the suspended joints might not carry more than 4 tons, and the engine on its driving wheel is often loaded to 5 or 6 tons; thus it would actually make the joint sink and take a permanent set every time it passed over it, and would result in breaking the fish plates and flattening the rail-ends, making a bad permanent way. Professor Rankine's rule is very much more wasteful of material than the sections which I have designed, and as it was devised a long while ago it is quite time that rolling-stock engineers should confer with permanent-way engineers in order to lay down a rule for constructing rail sections, not considering weight so much as carrying capacity—a point which is, I believe, very often neglected, or at least not considered in proportion to its importance.

Length of Rails.—It follows that the longer the rail the more saving there is in fastenings, and the better the road; but there is a limit beyond which it is not practicable to go, not so much from the point of manufacture, as rails are now rolled in two or three lengths, but for sake of the easier handling and transport, both by land and by sea. The long rails require separate wagons for overland transit; this should be taken into consideration, and the normal length not fixed beyond the practical limit. Now American engineers have gone to the extreme, and have chosen 30 ft. as their normal length; in fact they are not stopping there, and it is naturally required that the imported rails should be of the same length as those made at home. Not that English makers cannot roll them equally long as Americans, but the cost of transport across the Atlantic increases with the length of the rail, as the vessels must be large in order to accommodate the greater lengths. Besides this, the longer the rail is the more likely it is to get crooked, especially on board ship; and on the road itself the plate-layers require some consideration, as they have quite enough to do to handle a rail of 30 ft. length, especially if it is of good weight, say of 56 lbs. and upwards. I would, for my part, not go beyond 30 ft.; and allow 10 per cent. of short lengths in even feet down to 20, and I would permit a variation in length of ¼ in. above and below the regular measure. Considering that the rail cut off hot at the rolling contracts about 5 in. more or less, according to its temperature when cut, ¼ in. is not too much to allow, if we wish to avoid grinding it cold to the exact length. If the punch holes permit an opening of the joint of ¼ in. there would be no reason whatever for not allowing ¼ in. in the normal length, even when rails were renewed on the track one by one. On the continent of Europe engineers are very strict with the length, and do not allow more than a millimeter or two of variation, so that rail makers have been obliged to make arrangements for grinding all rails, as they could not cut them near enough. This is becoming a great hindrance, especially where production is large and space limited; if we suppose an output of 2,000 tons a week, which means 10,000 rails to be ground, a dozen grinding machines must be at work. The required space and the cost of working will naturally increase the cost of rail production, say several shillings per ton, which, of course, the railway companies would have to pay, without deriving any corresponding advantage from an improved track; for the grinding really does the rail more harm than good in point of durability. Such nicety in length as a millimeter is really not needed in practice, if the rail-joint be constructed so as to allow half an inch opening for expansion and contraction. What is of greater importance is to establish standard measures, so that all the rails for the same road, even if made at different works, would be cut to the same standard length, and this could easily be done by the inspectors using the same steel rod or crown yard measure to correct the length to which the rails have to be cut before rolling commences. If this be neglected the 30 ft. length made in one place may vary ¼ in. and more from those made in another works, although makers may each have used their own standard measure.

Drilling, Punching, and Notching.—The bolt holes in rail-ends should be drilled in steel and punched in iron rails. The punching and notching of the steel rails was at first done in the same way as for iron rails, but as the material, when originally introduced, was rather hard, it caused breakage through the bolt holes of a good many rails; and I believe I am right in saying that nothing checked the introduction of steel rails so much as the failure of that material through treating it in the same rough mechanical way as that to which iron was submitted. Iron, as a metal made from puddled material, can stand a rough mechanical treatment which the ingot metal will not bear; and through neglecting to give attention to this peculiar feature of the new metal its introduction was greatly retarded, notwithstanding the excellent wearing results it gave as compared with iron. I found this of such great importance that I carried out a large number of comparative tests and experiments upon the loss in strength which iron and steel rails suffer in different countries through punching and notching, and I described the results in a pamphlet published in 1873. It was shown by this investigation that for punching there must be longer fish plates and a greater distance between the end holes and rails, leaving solid material of say about 2 in. at least, which would mean longer centres and longer fish plates. To drill the bolt holes, of course, is the safest plan, particularly if the web is thick and the steel is hard. On the Continent engineers keep to drilling exclusively, and makers are prepared to drill both round and oval holes without extra charge. Formerly this was a great objection among the English railmakers, but I am pleased to say that most of them are now willing to drill the holes, and the extra charge made is little or nothing. Nevertheless, if it is not specified, they prefer the punching.

In America the longer fish-plates are preferred, and this may be correct; but my theory is that it is not the length of the fish which makes the stiffness of the joint, and it would be a waste of metal to extend it lengthways. If applied in the vertical direction stiffness is obtained in proportion to the square of the height. The form of the holes punched in the fish-plate must be guided by the neck of the bolt, which should have just so much play as not to shift round when screwed up. Although I have adopted a square-necked bolt, and corresponding holes in the fish-plate, I must admit that the oval or elongated holes, with corresponding neck in the bolt, lately introduced, are preferable, simply because they do not weaken the fish-plate so much as the square hole. Anyhow the standard bolt for each road should be kept so as to preserve a uniform

plant, and to avoid the necessity of two sets of bolts and fish plates for the same railway. The fish plate should be punched hot and pressed.

The notch in the iron rail was formerly made in the middle of the rail, which was then thought desirable for preventing the rail from traveling. As long as iron rails only were used, the plan worked with perfect success, for iron stands the rough treatment of notching in flanges in the middle of the rail without very great loss of strength, as is seen from the results of experiments above mentioned. Quite different, however, was the result when steel was treated in a similar manner; it was then found that the notch placed in the middle took away almost the entire strength of the rails, so that they sometimes broke even in handling or in falling from a truck, and if they reached the road whole there were not many which did not break at an early period after being laid. This, as we have seen, retarded the introduction of steel rails, and it proceeded not from any fault in the material, but from ignorance of its proper treatment. The notch in the middle was consequently abandoned and moved to the ends; this materially improved matters, and nowhere now are any steel rails made notched in the middle.* There are two ways now adopted to prevent the road from creeping. Engineers' opinions differ very much as to the liability of a road to travel, for while some find that the rails, even in mountainous countries, as Norway, with gradients of one in a hundred, do not require any notching, others in a flat country, like Holland, have complained that the whole road was traveling in the direction of Rotterdam, and they weakened their rails by seven notches, one for every sleeper. However, we may admit that for single roads there is no actual danger of creeping, but for double roads it is necessary to prevent it, so that notching of both iron and steel rails must there be regarded as imperative. I would suggest its being done in two ways, depending upon whether the road is laid with supported or with suspended rail-joints; in the former case corner notches are quite sufficient, and have no weakening effect, but in the latter angle fish plates must be used, these—and not the rails—to be notched or slotted with spike holes in the 2-joint sleepers. Iron rails, however, might be notched both at the corners and at 10 in. on one side and 12 in. on the other side; they would then suit for either laying on supported or for suspended rail-joints. As to which of these is preferable, a great difference of opinion exist among engineers. For my own part I prefer the supported. The size of the notches in steel rails for a ½ in. spike may be taken as ¾ in. and the depth as ½ in., and the corner either left or right, as long as they always keep to the same, and at the reverse corner of both rail-ends; but the notch ½ in. long by ½ in. deep might be of slightly rounded corners, as the sharper it is the more it weakens the rail.

Marking.—The rail should be marked with the maker's name and the year of manufacture, and also with the word *steel* to distinguish it from iron. All these marks should be rolled on the web of the rail in plain letters. The particulars are of great value and of comparatively no cost. Besides these, the inspector's stamp on the end of each rail after approval is of great importance. I have my well-known mark, a crown, hammered into each rail-end, and also the initials of my assistant, who passes the rails, so as to be able to refer to each man's work and to make observations of results subsequently. The railway company or employer in each case receives a copy of the inspector's book, and I retain the original in my possession, along with all the documents relative to the execution and inspection of the order.

Mode of Manufacture.—For iron rails there was a great inclination at one time to introduce stipulations in the specifications that would, under all circumstances, secure a good rail; but, although the stipulations increased in severity year by year, the quality of the iron rails gradually became worse. The result was that, where traffic was large and the endurance of rail of corresponding importance, steel was adopted. At least there was no certainty of obtaining an excellent quality of iron rails through merely specifying the most severe terms for their manufacture. In former days iron rails were made of a superior quality, which was capable of perfect welding, and naturally the results from the use of these were very satisfactory. But these rails cost twice as much as steel rails do now, and it is not to be expected that makers should now ruin themselves in supplying an extra quality of iron for an ordinary-priced article. Yet it was singular to watch the struggle between the producer and the consumer to secure it. There were cases where an extra price was actually paid for the superior quality of iron desired, but with no improved result. It was thought that the use of cinder pig, made from puddled cinder containing a large proportion of sulphur and phosphorus, could not produce a good pig-iron; nor could it afterward give a puddled bar which would weld together in the rail pile. Railway engineers thought they would overcome this by stipulating for the use of only mine iron and no cinder pig. Unfortunately, however, there is as much difference in mine iron as between cinder and good pig, and two large districts in England, namely, Northampton and Cleveland, yield ore which contains as much phosphorus as, and even more than, the cinder pig. The pig-iron consequently made from the pure mine, as it was called, produced equally bad iron, as unfit for welding in the rail pile as the other. The result was, that although an extra price was paid for mine iron rails they were no better than those obtained from the cinder pig. In fact, iron rails are not made nowadays of the same quality as they were thirty years ago, because there is no demand for the superior quality of iron rails since the introduction of steel. The latter will outlast by many times the iron rails in wear, and as for comparative merits, since the price is now not much more than that of the iron, or say but 10 per cent. higher, there is no question that steel in all instances has the preference. I would rather have steel rails of 20 per cent. less weight than iron. I should then gain 10 per cent. in the outlay, and I should surely get several times the amount of wear out of them. This, to my mind, shows a great mistake on the part of Americans in still importing iron rails, which is done at present in consequence of the difference in duty, this being almost double in the case of steel. During the construction of railways in Sweden iron rails were chiefly used, with the result of say fifteen to twenty years' life, but since steel became so cheap, and traffic increased, the renewals have all been made in steel rails. The mode of manufacture of both the iron and steel rails, as adopted in my specification, I believe is the simplest and most practical one, and is perfectly safe in the hands of any experienced inspector.

I could, however, fill a whole book with Continental specifications, many of which would much amuse both engineers and railmakers. I would do so if I thought them of any use, but my principle has always been to let the maker, to a

* Exceptions may, however, occur, and it so happened that in April last I was at the Hörde Works, in Germany, inspecting some steel rails for America which had a notch in the middle. At the same time Mr. Alexander L. Holley was there studying the Thomas-Gilchrist process. Rails were made by this process, and their strength compared by the falling test. They were found as strong as those of Bessemer steel, but the weakening effect of the notch was equally evident in both metals.

great extent, choose his own method of manufacture, so long as he allows the inspector to see that the rails made are, first of all, safe and sound, then correct in every exterior part, to insure their being easily laid, and giving a good and straight road likely to endure any reasonable amount of wear and tear that may be required. As for guarantee, I believe it to be useful where the railway is in constant communication with the maker, so as to allow of the rails being watched from time to time, to see if they are fairly treated; but where the manufacturer is distant from the railway which consumes his article, I think it is best for the railway engineer to look after his interests by good inspection, and to make sure that he has got what his specification demands before the rail is paid for.

The Lesson of Eight Years of the Hoosac Tunnel.

A railroad is never finished, unless it is a dead failure. If it is a success, its construction account is never closed. There is always some new development demanding expenditure upon the plant. Although it has been widely assumed that the seven-year contracts settled the status of the Hoosac Tunnel for that period, we believe that this session of the Legislature and every succeeding session, while it remains in the present relations to the state, will witness strenuous efforts to burst the limitations placed by Governors Talbot and Long upon the expenditure on the Hoosac Tunnel road in requiring that such expenditures should not exceed the net income. It will be urged that the state will find true economy in cutting loose from this restriction; it will be urged that a double track for the whole length and various facilities are needed, and when once the door of the treasury is again opened, it is not likely to be soon closed. At the same time Manager Gardner, like every other intelligent man of affairs who has ever dealt with the Hoosac Tunnel, realizes the gross incompatibility or friction between the state and the railroad. The boast of Louis XIV., "The state, it is I," is to Manager Gardner not a boast, but a lamentation. So it is to Gov. Long, so it has been to every governor who has had to run the state railroad. Every successive step confirms the wisdom of the policy which the *Republican* has advocated since the tunnel became a certainty—the consolidation of the tunnel line with the connecting roads east and west into a great single-headed corporation, and the necessity to this end of the cessation of subsidy from the state. When the state stops spending money on the tunnel road, then the road will readily take the corporation form; till then it never will. As leading up to this conclusion, let us review briefly the opinions of those who have in the past 10 years most earnestly studied this question.

In 1872, the near approach of the moment when the Hoosac Mountain should be pierced, led Gov. Washburn, of Greenfield, always a friend of the enterprise, to say in his message to the Legislature of this state:

"That the state itself can manage a railroad more economically or so as to serve the public better than private corporations, is contrary to all our experience."

He intimated that in his opinion the tunnel road ought to be leased or sold or in some way consolidated, so as to give it corporate control without relinquishing entirely the authority of the state. After having been in office a year, and the tunnel had been opened, he expressed himself still more vigorously in his annual message in 1873:

"I am decided in the conviction that the tunnel route should be consolidated at the earliest practicable day. In providing for this consolidation, as in chartering any new line, the commonwealth does not abdicate its supreme authority in the premises. The corporation will be but the servant, intrusted with certain powers to be used for the public good."

He advised the state to compel the roads to consolidate, if they would not consolidate without. The influence of the connecting railroads, however, which wanted the state to continue spending money, frustrated this policy, and in 1874 Gov. Washburn reluctantly "accepted the situation," as he said in his message, or a defeat of the corporation policy, but recommended a board of trustees to hold and manage for one year and investigate the whole question. This body, including C. F. Adams, Jr., President Chadbourne and Gov. Washburn (Mr. Adams having been at one time the advocate of the policy of regulating trunk lines by the state ownership of one), unanimously recommended and urged the consolidation of all the connecting roads with the state road into a corporation. They said:

"We hold it almost puerile to hope that the tunnel route can be developed in any such way as to justify its construction except through the agency of an energetic, concentrated and wealthy management. In organizing such a management, it may be desirable to secure every guaranty of the use of the tunnel by weaker connecting roads; but it is none the less true that the business of the main through line can only be developed—as the people of the state have a right to expect it to be developed—through a management as vigorous as those with which it is forced either to contract or to contend."

Gov. Gaston very heartily concurred with this view in 1875.

Gov. Rice in 1876 quoted the language of the corporators as above and urged the adoption of their view. From this position he never receded. In 1878, after two years' experience of the working of the tunnel line, Gov. Rice advised the Legislature:

"I cannot but repeat my previously expressed conviction of the expediency of separating the treasury of this railroad from the treasury of the commonwealth and of relieving the executive department of the government of its supervision by placing the road under corporate management familiar with railroad business and competent to insure proper connections when opportunity shall offer."

In 1879, Gov. Talbot, quoting and endorsing Gov. Rice's views, added:

"In my opinion the commonwealth will never reap anything approaching an adequate return for its enormous investment, until this road, totally divorced from the public treasury, takes its place with all the weight and influence belonging to its capital and position in a strong, wealthy, energetic through line consolidated if need be to the Mississippi or the Sierra Nevada. Only then will the tunnel be able to justify its existence, and secure its share of the profit to be earned by railroads under the necessity now common to all—namely, the necessity of doing the largest amount of business possible, with the most approved outfit and at the lowest possible rates."

Now in 1881, under a new manager of conceded ability, and with contracts well settled for a period of years, the expressed need of the property but re-echoes the opinion of all those who had previously studied its workings. Mr. Gardner has well illustrated to the committee of the Legislature, as we show elsewhere, the many things which the state railroad could do as a corporation which it cannot do now. He has covered the ground in that respect so far probably as it appears to him in the standpoint of a state official, but he is guilty of one serious omission in his catalogue of deficiencies. There is one very remarkable function which a corporation

can exercise in behalf of a business enterprise which the state cannot exercise—a corporation can get capital voluntarily tendered to develop its enterprise; the state cannot. The Hoosac Tunnel corporation, if it were a corporation, with the business it is now doing, would have no difficulty in raising the funds to double-track 44 miles of road. The New York & New England road sells 6 per cent. bonds at par. Why should the state go on in the vain effort to "complete" a railroad which will never be completed, and which, the more successful it is, will require the more outlay?

The answer will be made to this reasoning that the Boston & Albany influence is in favor of this disposition of the property. There is ground for the imputation, but if the interests of the Boston & Albany Railroad were consulted, it is more probable that state-ownership and state-management of its rival would be just the policy which it would prefer.

Although the seven-year contracts have been made with some roads and are to be made with others, Manager Gardner does not hesitate to urge a change to corporation management before they expire. They would not be annulled by change. At this point a stand should be made. No appropriation should be authorized outside the net income of the property, or else the state should consolidate the Fitchburg state road and the Troy & Boston into one corporation, in which the state should be represented by its own investment and its own directors. The stocks of the dividend-paying roads might be given a preferred basis over the state stock for a time. The great consolidated through line to the Hudson at least, if not to the Sierra, is the necessity of the state, the railroad and of the whole situation.—*Springfield (Mass.) Republican.*

Division of Duties between a General Passenger Agent and a General Ticket Agent.

The following circular, dated at St. Louis, Jan. 1, 1881, and directed to the officers and employees of the Wabash, St. Louis & Pacific Railway Company and the officers and agents of other railway and transportation lines, will be found of general interest:

GENTLEMEN: For the purpose of increasing the efficiency of the general passenger and general ticket departments of this company, the duties of the heads of those departments are hereby defined as follows:

DUTIES OF THE GENERAL PASSENGER AGENT.

1st. The General Passenger Agent employs and has entire charge of all traveling passenger agents, arranges their fields and duties, oversees their expenditures, and certifies to their salary and expense vouchers. In all cases these men report to and are absolutely under the orders of the General Passenger Agent. Should they need passenger rates other than those given in the printed tariffs, they are furnished through the General Passenger Agent.

2d. Has charge of all local passenger solicitors, city passenger agents and similar passenger solicitors, in all matters saving questions relating to passenger rates.

3d. Has charge, as far as relates to passenger business, of general agents and other located agents off the line; but in no case does he quote rates other than those of the printed tariff, unless first authorized by the General Ticket Agent.

4th. Has special charge of all matters connected with the ticket office or procurement of business (except so far as relates to rates and tickets) at the following stations, viz.: Detroit, Toledo, Chicago, St. Louis, Peoria, Burlington, Keokuk, Quincy, Hannibal, Kansas City, St. Joseph, Council Bluffs and Omaha.

5th. The placing of tickets in the hands of agents off the line of the road, or outside of the regular ticket offices of this company at the terminus, will be determined by the General Passenger Agent, but the rates at which such tickets are to be sold will be fixed by the General Ticket Agent.

6th. Arranges with foreign roads all matters relating to the exchange of traffic, commissions on emigrant business, the arrangements of through cars, and all matters, save rates and the issuance of tickets.

7th. Has charge of and pays all commissions to ticket-sellers, and arranges with foreign ticket-sellers all matters relating to passenger business, except the question of rates and tickets.

8th. Looks after coupon-ticket agents and sees that in their ticket sales they treat connections fairly.

9th. Sees that this line is properly represented at coupon offices of connecting roads.

10th. Advises the General Ticket Agent as to all cuts of passenger rates made by competitors, and as to the propriety of meeting such cuts, but does not assume at any time to order such cuts to be made unless authorized by the General Ticket Agent.

11th. Has charge of and arranges for and distributes all advertising forms, local as well as foreign. This includes maps, bulletin boards, time tables in railroad guides, newspaper advertising, and anything else relating to advertising the passenger business of the road.

12th. Issues all editorial passes, trip or annual, on account of advertising.

13th. Has charge of the General Baggage Agent, the baggage department being merely a bureau of the General Passenger Department.

14th. Has charge of all omnibus and carriage transfer matters, and arranges rates to be charged for transfer of passengers and their baggage.

15th. The General Passenger Agent will look after the eating houses, sleeping, parlor, and chair-car service of this company.

16th. The matter of representation for foreign roads at our coupon stations and the adjustment of all pools shall be decided jointly by the General Passenger and General Ticket Agent.

17th. When contracts are made for the transportation of military or theatrical companies, the General Passenger Agent will arrange for such accommodations as may be required.

DUTIES OF THE GENERAL TICKET AGENT.

1st. The General Ticket Agent will prepare, print, sign and distribute all tickets or orders for tickets, and, as a rule, will arrange with foreign general ticket agents for needed representation over this road, but when the General Passenger Agent or any of his force find that any foreign road has not the proper representation on sale at its coupon offices, he or they will at once apply to the General Ticket Agent of the foreign road to prepare and place on sale the needed tickets.

2d. He will arrange, make and quote all passenger rates, local, special, military, theatrical, colonist, commutation, excursion and all others, and will be held responsible for all rates made.

3d. He will prepare, print and issue all passenger tariffs.

4th. He will provide all ticket offices of this company with stamps, dies, ticket cases, and similar appliances needed for the proper preservation and sale of all tickets.

5th. He will instruct all ticket agents as to the sale of tickets, whether at regular or other than regular tariff rates.

6th. He will furnish conductors with transfer tickets, stop-over and other checks, and instruct them as to their

duties so far as they relate to rates, tickets and kindred matters.

7th. He will adjust with general ticket agents of foreign roads this road's proportions of through rates.

8th. He will, as a rule, suggest to general ticket agents of foreign roads the forms of tickets they should prepare and place on sale in their ticket offices, so as to secure to this road an adequate representation.

9th. He will prepare and issue all ministerial permits.

10th. He will arrange for the charter of cars for all excursions and arrange tariffs for the same.

11th. He will arrange for and have charge of all theatrical business, and in looking after this class of business the General Ticket Agent will arrange with the General Passenger Agent for soliciting such business when it is necessary.

12th. When contracts are made for the transportation of military or theatrical companies, the General Passenger Agent will arrange for such accommodations as may be required.

13th. The General Ticket Agent will advise general ticket agents of foreign roads when to put on sale or take off sale through tickets over this road.

14th. The matter of representation for foreign roads, at our coupon stations, and the adjustment of all pools, shall be decided jointly by the General Passenger Agent and the General Ticket Agent.

H. C. TOWNSEND, General Passenger Agent. GEO. H. DANIELS, General Ticket Agent. Approved, JNO. C. GAULT, General Manager.

English Opinion on New York, Lake Erie & Western Preferred Stock.

The following circular was issued from the office of the New York, Lake Erie & Western in London, dated Dec. 28, and signed by E. W. Watkin, T. W. Powell and John Westlake, Voting Trustees:

Referring to the annual report of the New York, Lake Erie & Western Railroad Company for the year ending Sept. 30, 1880, now being circulated, the undersigned regret that they are unable to concur in the reasons given in it for the non-payment of the preference dividend, and in consequence of the numerous complaints addressed to them, they have taken the opinion of Mr. Benjamin, Q.C., on the subject, a copy of which is set out at the foot of this circular.

The course the undersigned have suggested to the President, in which he concurs, is that the opinion of the court in New York should be taken on the subject in a friendly suit, which ought not take much time, or involve any great expense, as all the facts appear in the report, and they trust that that course will be acceptable to the preference shareholders.

Although it does not come strictly within their duties as voting trustees, the undersigned are willing, if desired, to take charge of the proceedings on behalf of the preference shareholders.

If you concur in that course, be good enough to sign and return the inclosed as soon as possible, when the necessary instructions will be sent out to a competent legal firm in New York.

"Opinion.—We assume for the purpose of this opinion that the synopsis of the annual report of the company set out in the case is correct, and that the directors have, in fact, as appears from that synopsis, declared that there has been a profit made on the transactions of the last year. The only question, therefore, is whether the preference shareholders are entitled to have the profit, or a sufficient part of it, applied in or towards paying them a dividend of 6 per cent.

"The contract with the preference shareholders is contained in Clause 13 of the plan and agreement for foreclosure of the Erie Railway Company, which forms part of the constitution of the present company. The preference stock is there described as entitling the holders to non-cumulative dividends at the rate of 6 per cent. per annum, in preference to the payment of any dividend on the common stock, but dependent on the profits of each particular year as declared by the board of directors.

"We think upon the construction of the words, and also upon the authority of the decision of the Master of the Rolls, in the case of *Dent vs. The London Tramway Company*, recently decided, that the right given by those words to the preference shareholders is not a mere preferential right on distribution, but an absolute right to have sufficient part of the declared profits applied in payment of their dividend, and that any application of the profits, except subject to that right, is wholly *ultra vires* of the directors or of the company. The rules of construction of a contract are the same in America as in England, and in our opinion the Courts of New York would come to the same decision upon the point as that given by the Master of the Rolls.

"We have examined the case to which we have been referred of *St. John vs. The Erie Railway Company*, reported in 224 Wallace, p. 136, and find that in that case the Supreme Court of the United States dismissed the claim of the preference shareholders distinctly on the ground that 'there were no net earnings earned in the year that could be properly applied in payment of preferred dividends.'

"The present case is exactly the reverse, and we can entertain no doubt that the decision also would be the reverse of that reported in 224 Wallace.

"Temple, Dec. 18, 1880.

"(Signed) J. P. BENJAMIN.

"(Signed) A. R. KIRBY.

"Lincoln's Inn, Dec. 18, 1880."

The Late Ephraim N. Winslow.

Ephraim N. Winslow, Chief Engineer of the Old Colony Railroad Company, died at the United States Hotel, Boston, Dec. 15, 1880, at the age of 56 years. He was a native of Freetown, Mass., where he was born May 23, 1824, and a lineal descendant of Kenelm Winslow, who came to Plymouth in 1620.

Mr. Winslow received his rudimentary education in the common schools of his native town, and early manifested taste and ability in mathematical pursuits. He commenced his study of civil engineering with Simeon Borden, Esq., of Fall River, who was, at that time, eminent in his profession, especially in the department of railroad construction. He was employed as an assistant on the line from Fall River, via Middleboro to South Braintree, now a portion of the Old Colony Railroad, where he did valuable work and fully justified the expectations of his instructor.

When the Cape Cod Branch Railroad was constructed from Middleboro to Sandwich, Mr. Borden was engineer in charge, but the practical work was largely intrusted to Mr. Winslow. He then had responsible employment under sagacious advice, and grew rapidly in professional knowledge and experience.

When the Cape Cod Railroad was extended from Sandwich to Hyannis, the engineering was intrusted, jointly, to Mr. Winslow and the late Sylvanus Bourne, of Wareham, who was then Superintendent of that railroad. Mr. Bourne had other duties, and Mr. Winslow gave to this business his

constant attention, feeling and sustaining the entire responsibility. He was soon appointed Superintendent of the Cape Cod Railroad, on the retirement of Mr. Bourne, and not long after he was elected Treasurer and one of the Directors of the company, in which positions he continued until its union with the Old Colony Railroad. He became the actual manager of the Cape Cod road in its departments of engineering, construction, operation and finance, and in each and all was trusted with entire confidence by his directors.

When the line from South Braintree via Taunton to Somerset Junction was constructed, Mr. Winslow was employed as Engineer. The road was then called the Dighton & Somerset Railroad, though it was well known that the Old Colony Railroad was concerned in it, and that it was intended as part of a better line, for New York business, between Boston and Fall River. The work on this piece of road was most thoroughly and skillfully done, reflecting credit on the engineer.

When the Cape Cod road was absorbed into the Old Colony, in 1872, Mr. Winslow was appointed Chief Engineer and elected a director of the latter company, which positions he continued to fill until his death.

He had charge as engineer of the construction of the Wood's Holl Branch of the Old Colony, and the extension of its line to Provincetown on Cape Cod, and he designed and superintended the construction of the bridge across Taunton Great River at Fall River. In building this bridge it became necessary to adopt methods not before in use in New England. The foundations were put in by the pneumatic process, which had before been used in the West, especially in the Missouri River, where secure foundations could not otherwise be reached; and it became necessary for Mr. Winslow to make himself familiar with the process, and to procure the needful men and machinery to carry forward the work. He also had the supervision on much work on wharves at the terminal points of the Old Colony road, in addition to repairs and adjustments on its extensive lines of 475 miles. In all these various professional pursuits he fully met the requirements of his duty. He was characteristically methodical, cautious, judicious and conscientious. He was quiet, simple and unobtrusive in his manners, firm in his opinions and convictions and sincere in his friendships.

It will be seen that his whole life was spent in the railroad service of the Old Colony section of Massachusetts, and upon what is now a part of the Old Colony Railroad. Through the whole time he was devoted to his duties, taking no vacations, except now and then, such as were in the line of railroad service. The people among whom his days were spent, and especially his co-directors, always held him in the highest respect, and feel a sense of great loss in his death.

Mr. Winslow was for many years a director of the bank in Yarmouth, Mass., where he kept his Cape Cod Railroad account; he was also President of the Nantucket & Cape Cod Steamboat Company, which is part of the Old Colony system; and was a director in some other railroad lines, which are held in the Old Colony interest.

He was buried at Wareham, Mass., his obsequies being attended by a large number of railroad men and personal friends.—*Transactions Boston Society of Civil Engineers.*

Railroad Manufactures in South Chicago.

The Chicago Tribune of Jan. 9 says:

"There is no longer any doubt that the section now known in a general way as South Chicago, will at some day not very far distant be one of the largest manufacturing districts in the world. The location of the vast car-works to be managed by the Pullman Car Company, and the construction of the town of Pullman, now springing up like magic on the west shore of Calumet Lake, have assured this future to South Chicago, which in a general way is meant to include the southern portion of Hyde Park township. The city now in progress of construction under the auspices of the Pullman Company will probably be the most complete manufacturing settlement on this continent. It will be provided with vast shops, model houses, gas, water, pleasure grounds, and all the accessories of comfortable modern existence, and will have a population of 10,000 people within a year. It will have a railroad of its own connecting with the belt railroad, and so with all the other railroads that centre in Chicago. A canal is to be constructed across Lake Calumet, connecting with the Calumet River, and thus bringing navigation up to Pullman. In addition to the car-works now building, vast locomotive-works will be erected under the partial auspices of the same company, and will be located in the same neighborhood. These will attract other manufacturing interests. Indeed, applications for land to be used in that way have already been made, and the new improvements, in addition to the large works already in operation, such as the Potter Rolling-Mills and the Brown Iron Works, and the great nail factory, will make this section within a few years the busiest and most enterprising of all American manufacturing centres. The future growth of this portion of Chicago, as it may properly be regarded, is assured beyond all peradventure except universal panic, plague or famine."

Engineers' Club of Philadelphia.

At the regular meeting in Philadelphia, Jan. 15, Mr. Charles A. Ashburner, Chairman of the Committee on Information, presented a paper on the progress and methods of the Pennsylvania State Geological Survey. Forty-eight counties have been entirely completed, 18 counties partially surveyed and seven counties remain to be surveyed. The Board of Commissioners estimate that it will require three years to complete the survey of the entire state. He also read notes on mine topography, in which a new method was proposed for determining the area of the available coal in the anthracite region, and cited an instance in which the hypothesis of the method had been sustained by after developments. He also exhibited a complete set of specimens of the crude and refined petroleum from Baku, Galicia and other European fields, recently received through Hon. Lewis Emery. He also presented a paper by Colonel James Worrall, member of the club, upon the routes and methods which have been proposed for crossing the Isthmus. The Panama, Nicaragua and Tehuantepec Canal routes, and the ship railroad of Captain Eads, were treated, forming a paper too comprehensive to be fairly treated in a short abstract. Mr. T. M. Cleemann read a paper on the strength of wrought-iron columns, showing that the accepted formula of Rankine and Gordon gives imperfect results, and urging the necessity of further experiments on various shapes in order to complete it and render it more exact. Professor L. M. Haupt read a paper on intercommunications in cities, showing the great value of increased facilities of travel, and applied them specially to Philadelphia. The number of persons using the horse cars during the last year was about one hundred millions, and the value of a saving of one mile in distance and its equivalent in time and power was computed upon this basis with some surprising results. The paper was limited to a consideration of the street system only, the railroad system being reserved for the future. The paper contained some valuable suggestions as to important proposed improvements.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

INVESTIGATION OF BOILER EXPLOSION.

The report of the Massachusetts Railroad Commission on the locomotive boiler explosion that occurred on the Fall River Railroad last November, which was published in the *Railroad Gazette* last week, is, we believe, the first official report of this kind that has ever been made by a board of railroad commissioners, or other similar body, in this country. Those who are familiar with the reports of a similar character which are made by the British Board of Trade will, no doubt, join us in the hope that this first American report of this kind may not be the last. While the work of the Massachusetts Commission is not all that could be desired and seems to be defective in some important particulars, yet it is a very good beginning. Its chief defect consists in the fact that it does not make the cause of the explosion nor the construction of the boiler plain to the reader. The initial rupture of the boiler, one of the United States local inspectors of steam vessels tells us, "was on the left-hand side of the wagon-top, just above the horizontal diameter of the boiler, where there was a crack extending the whole length of the wagon-top and $4\frac{1}{2}$ ft. long." Nothing is said, though, to indicate whether this crack occurred along the edge of a seam, as such cracks usually do, or not; or whether the grain of the fractured plate ran parallel to or at right angles to the crack. We are not informed either whether the fracture was above or below the top row of stay-bolts. These points, if elucidated, would all be instructive to those who design, construct and have the care of boilers. The lesson, too,

would be the more impressive, because it "is emphasized by a loss of life."

The inspector says further:

"The steam acting upon this large plate (forming the wagon-top), which was suddenly detached for $4\frac{1}{2}$ ft., threw it upward and tore it mostly through the line of rivet-holes at each end, running over and down the flat side opposite, pulling through 51 screw-stays, and then tearing itself clear from the boiler. This piece, which formed the entire crown of the shell of the boiler, including a dome 34 in. diameter, measures about $4\frac{1}{2} \times 8$ ft."

Nothing is said here, it will be observed, about roof or sling stays, connecting the crown-bars with the shell of the wagon-top. Were there such stays or not, and if there were, how were they arranged?

From the report it is also impossible to tell whether the shell of the boiler at the base of the dome was strengthened with a reinforcing ring or not. All or any of these facts may have an important bearing on the cause of the explosion.

The beginning of the rupture was due to a crack in a plate in almost exactly the same position as the one which caused the explosion at Hoboken, on the Delaware, Lackawanna & Western Railroad, Oct. 28, 1879, which was described and illustrated in the *Railroad Gazette* of Jan. 23, of last year. In another number, Feb. 6 following, attention was called to the fact that the locomotive "Saco" on the Portland & Ogdensburg Railroad exploded in 1874 from the same cause. The explosions of the tug-boat "Popham" at Bath, Maine, and of the steamer "Adelphi" at South Norwalk, Conn., in 1878, when 15 people were killed and many injured, were of the same character. The question, then, of the cause of cracks of this kind occurring in the locality they do is of much importance. Various explanations have been given, but none are entirely satisfactory. In fact, there are certain phenomena which occur in this locality in locomotive boilers which indicate some very great strain or disturbance which is not perfectly understood. It is well known that the great majority of the stay-bolts that break are in the top rows or the sides of the fire-box, and generally towards the front end. What is also singular is, that almost universally they break next to the outside plate, and the fracture nearly always begins in the top edge of the bolt.

In view of all these facts, if the Railroad Commissioners could have given a drawing of the exploded boiler, showing the lines of fracture, the position of the seams and braces, and in part a complete representation of it, they would have supplied those who are investigating such subjects with the information required to form an intelligent opinion, and by which their theories could be tested. Such drawings accompany many of the reports of the British Board of Trade and are of very great value in explaining the causes of locomotive boiler explosions.

It would be unwise to expect that a body like a Railroad Commission could explain all the perplexing circumstances and events which occur in railroad accidents, but it would hardly be demanding too much to ask them to lay before the public a full statement of the circumstances attending such events as the explosion of boilers.

In their report the Massachusetts Board recommend legislative action upon the subject of locomotive boiler inspection. Even so distinguished a body as this commission, it seems, is not free from the feeling that the ills of life can generally be cured by legislation. It would not perhaps be wise to say that no legislation is needed, but it is certainly true that intelligent investigations and reports would do much to make legislation unnecessary.

A great difficulty in the matter, however, is that any system of investigation of railroad accidents by separate state authority will inevitably lead to much diversity in the manner of making them, and of their usefulness to the community. Not every state certainly will secure the services of thoroughly competent experts to make investigations in all departments of railroad management. If a national system of accident inspection, such as was proposed by Mr. Adams, and a bill for which was introduced by Mr. (now President-elect) Garfield, were established, we would be more likely to secure inspectors who would make much more intelligent reports than it would be possible to secure by a system of investigation made by the authorities of each state. It is not clear why it should be wise and proper to have boards of United States inspectors of steamboat boilers, and unwise to have a similar board to investigate locomotive boiler explosions. There is, as was shown in our issue of Jan. 23 of last year, an average of between 17 and 18 boiler explosions in this country per year. Let these be intelligently investigated and fully reported on, and it would do much to prevent such occurrences. There is, for example, a prejudice which prevails against the use of a

pressure test for boilers, and also in other cases a superstitious reliance on such tests, both of which would be rapidly dissipated if an intelligent board of examiners should report 17 or 18 times a year and each time reiterate their recommendation, as they would often have occasion to employ both a pressure test and also careful inspection, and not to rely implicitly on either or both, but depend more on good design, material and workmanship, using inspection only to detect defects. Such a board, if competent for its work, would point out errors in design, would stipulate the qualities which boiler material should have, and insist on frequent and rigid inspection.

The legislation which seems to be needed most is a law establishing competent authorities to investigate and report on such accidents, and to have exploded boilers photographed, so as to show the rupture fully and clearly. As it is now, railroad companies, or their officers, often use every effort to hide the causes of accidents, and in that way deprive them of the only value they have, which is to warn us how to avoid them in future.

Chicago Shipments Eastward.

There has recently been issued by Mr. Fink, as Chairman of the Joint Executive Committee, a circular calling attention to the desirability of extending the division of east-bound freight at Chicago, which, at present, applies only to the roads whose terminus is in Chicago, and not to their connections for the East over which the freight passes on its way to its destination, so as to include the latter—that is, to prescribe the percentage of freight each of the lines shall receive all the way from Chicago to its destination. At present the Great Western, the Canada Southern and the Grand Trunk compete with each other for the 26 per cent. of the Chicago freight which the Michigan Central carries as far as Detroit, and the New York Central and the Erie compete at Buffalo and Suspension Bridge for it, and these roads have as much inducement as ever to use the usual methods to secure consignments by their lines, though it makes no difference to the Michigan Central. This was the cause of the troubles in the early part of last September, and it is sure to give trouble again whenever the roads have not freight enough to keep their cars busy. It is not so much to the desirability of extending the pool to cover all the lines, though, as to the interesting figures given in this circular that we purpose to call attention now. These show the actual proportions of the Chicago freight that have passed over the several lines all the way from Chicago to destination, given for two periods, the first from Jan. 9, 1879 (when reports first were made), until the Grand Trunk's award of a percentage of the traffic took place (June 1, 1880); and the second the five months thereafter, ending with October.

In the first period the Eastern trunk lines received the following from each of the Chicago roads, expressed in percentages of the total Chicago shipments, the part of the Grand Trunk east of Toronto being regarded as one of these trunk lines:

	Grand	N. Y. Cen.	Erie.	Penna.	B. & O.	Total.
First Period: Trunk.						
Mich. Central.....	5.19	19.14	4.90	.....	.....	29.29
Lake Shore.....	0.11	19.60	4.60	3.45	.....	25.85
*P. F. W. & C. 0.50	.....	.....	1.31	19.72	.....	21.53
P. C. & St. L. ....	.....	.....	0.64	3.31	.....	9.95
B. & O., Chic. ....	.....	.....	.....	.....	9.12	9.12
Div.....	.....	.....	.....	.....	.....	.....
Total.....	5.80	38.83	15.51	20.48	9.12	95.74
Second Period:						
Chic. & Grand						
Trunk.....	6.80	.....	3.87	.....	.....	10.67
Mich. Central.....	3.81	20.64	2.59	.....	.....	27.04
Lake Shore.....	0.12	17.02	5.84	1.87	.....	25.49
P. F. W. & C. ....	.....	.....	0.60	10.24	.....	10.43
P. C. & St. L. ....	.....	.....	6.25	1.88	.....	8.13
B. & O., Chic. ....	.....	.....	.....	.....	5.91	5.91
Div.....	.....	.....	.....	.....	.....	.....
Total.....	10.73	38.26	10.28	22.90	5.91	97.17

* Including shipments by the Chicago & Lake Huron, which for some 30 miles from Chicago passed over the Fort Wayne road until the opening of the Chicago & Grand Trunk into Chicago.

Aside from the purpose for which these figures were intended, that is, to give a basis for an agreed distribution of the freight among the lines east of the termini of the Chicago roads, there are many interesting facts brought out by them. First we see that the Grand Trunk (east of Toronto) has added to its proportion only 5 per cent. of the total Chicago traffic since its Chicago line was admitted to the pool, though that line was awarded 10 per cent. of it and has actually carried 10½ per cent. A considerable part of this freight, however, is consigned by way of its Buffalo line to the Erie, and since the opening of the Chicago & Grand Trunk the Michigan Central has brought but 3.81 per cent. of the Chicago traffic to the Grand Trunk, against 5.19 per cent. before.

Comparing this with the first period, when the Chicago & Grand Trunk was not opened or not in the pool, we see that the gain of 5 per cent. to the Grand Trunk has come, not from the New York Central and

the Erie, as might have been supposed, but from the Pennsylvania and the Baltimore & Ohio, which have also furnished a considerable increase to the Erie, the New York Central remaining about the same.

It is noticeable that in both of these periods the Pennsylvania's own road, the Pittsburgh, Cincinnati & St. Louis, has supplied much more traffic to the Erie than to the Pennsylvania itself—in the first period twice as much, and in the second more than three times as much. The decrease in the freight carried by the Michigan Central to the Erie is evidently due to the diversion of Grand Trunk shipments from the Michigan Central to the Chicago & Grand Trunk. The two together in the second period brought the Erie a quarter more than the Michigan Central alone in the first period. It is notable that the Lake Shore was a much better feeder of the Erie in the second period, bringing it then 5.88 per cent. of the Chicago shipments, against 2.60 in the first period. Comparing the totals of the trunk lines in the two periods, we find that the Grand Trunk and the Erie gained largely, the Pennsylvania and the Baltimore & Ohio lost largely, while the New York Central remained nearly unchanged, with nearly twice as much of the Chicago traffic as any of its rivals. It should be remembered, however, that the second period includes only months when navigation was open, and may not be expected to represent the general course of shipments for a whole year, as this is or may be considerably modified when navigation is closed. Certainly not all the changes can be attributed to the opening of the Chicago & Grand Trunk.

The Grand Trunk (east of Toronto) in the latter period got about 63 per cent. of its traffic from its own road, and 35½ from the Michigan Central, which is thus still an important feeder for it. The New York Central gets all its Chicago freight from the Vanderbilt road; formerly it came in about equal quantities from each, but in the last period the Michigan Central has contributed a sixth more than the Lake Shore, and the Erie has gained the difference. The Erie, as at St. Louis, lays nearly all the roads under contribution, but only the Pittsburgh, Cincinnati & St. Louis gives to it more than to any other road. The Pennsylvania in the second period received 83 per cent. and in the first 74½ per cent. from the Fort Wayne and in both about as much from the Lake Shore as from its own leased Pittsburgh, Cincinnati & St. Louis.

One of the chief questions at the time of the opening of the Chicago & Grand Trunk was its probable effect on the Michigan Central shipments by way of the Grand Trunk. We cannot say just what effect this opening would have had on the distribution of the shipments among the Chicago roads, because the apportionment has affected that, but the distribution of the Michigan Central shipments among its connections east of Detroit has been as follows in the two periods:

To—	First period.	Second period.
Grand Trunk.....	18.82	14.40
Great Western and Canada Southern pool.....	81.08	85.44
Great Western (for Toronto).....	0.10	0.16

This diversion of Michigan Central traffic from the Grand Trunk was shown above (by the smaller percentage of the whole Chicago traffic brought to the Grand Trunk by the Michigan Central in the second period), but here in a different way. The 18.80 per cent. of the Michigan Central's Chicago traffic in the first period made 89½ per cent. of the Grand Trunk's, and the 14.4 per cent. of the Michigan Central's traffic in the second period made 35½ per cent. of the Grand Trunk's. Thus, if the Michigan Central is much less important to the Grand Trunk than formerly, it still, as we have said, is a very valuable connection, bringing it more than one-third of all the Chicago freight that it gets.

The Study of the Political Sciences as Training for Railroad Officers.

It has been common enough in commenting on a great railroad corporation to speak of it as having the revenue of a "Kingdom," or employing an "army" of employés. It does not seem to have occurred to those who have used such terms, however, that the qualifications of those who administer these royal revenues and armies of employés need to be similar in many respects to those which fit men to govern nations and command armies. This is really the case, however, and is so even where the railroad managed has the revenue of a factory rather than of a nation and employs but a squad and not an army of employees, because the manager of the railroad has to deal with the whole community, and shape his course and calculations on the habits, industries, growth, temper and tendencies of the community which his road serves. Certain phases of the national life he needs to know better than any public officer in this country actually does know them, and he frequently does have an extraordinary knowledge of some of these, though in this country, if he has arrived at any principles in these matters it has usually been by an induction from his own experience and not from scientific training in what the

Germans call the political sciences, such as statistics, political economy, finance and administration. Indeed, these sciences are not much studied by any one here, and are not regarded as effective training for any occupation; candidates for administrative offices chiefly study them abroad; but, as we all know, this is not the kind of training that gets a man an office in this country.

On the 19th of October last, Dr. Lorenz von Stein, the celebrated professor of political economy in the University of Vienna, delivered a lecture before the Austrian Railroad Club upon the relations existing between railroads and political science. The principal points of the lecture, which was highly praised by the Austrian and German press, were as follows:

Every new contrivance or factor entering into the life of a community is obliged first of all to struggle for existence and place. For everything new and important produces new forms and arrangements, while it destroys old ones and thus necessarily becomes involved in war with ancient traditions and established interests. The contest is a proof, a test, which only that which has value can stand. If the new fact is valuable it wins a place, a field for itself, and the life of man has become richer by so much.

In the first years of their existence railroads had to fight for life, but they have won the battle and become a chief element in the world's labor. At first and until recently railroad men have been obliged to live for railroads, bothering themselves little about things outside of their special province. They have been quite right in doing this; the period of growth and consolidation has required all their time and care. But this first period is drawing to a close. It is now time that those engaged in railroad work should look outside of themselves and recognize that, while many things depend upon them, they in their work are dependent upon a still greater number of things. From the contest with the outside world comes the insight that they are only a part of an organic whole, including other factors which are continually striving to invade the provinces of railroad labor. This organic whole is called the state, and the science which concerns itself therewith—political science (*Staatswissenschaft*—state science). As the specialist does not feel and know that he is master of the factors and phenomena whose reciprocal action constitutes the life of his specialty until he has grasped their inner nature; so, as soon as he has recognized the reciprocal action between his specialty and the life of the state, does he also feel the necessity of understanding that organism which comprehends in a unity all separate provinces of human activity, extending beyond and including his own specialty. Without a knowledge of this state, its organism, its laws and its concrete life, he will never be able completely to grasp his own province of work, which is in every point dependent upon and limited by the state. Thus arises the necessity of a knowledge of political science for railroad men in addition to their own technical education.

The civil engineer sits at his table. He knows the topography, the hills and the valleys, the plains and the rivers and brooks. His task is to trace the line of a new railroad. He calculates and draws and constructs; he has drawn the line; it is the shortest and cheapest. But he looks at the map again; he sees a second and a third possible line, each costing nearly the same as the first. How shall he choose? Certainly not according to the technical principles of civil engineering. He must ask himself which line is most available which will pay best. The answer, to these questions is found in the production and consumption of the places served by the new road, the fertility of the land along the line, the present and future condition of the places to be connected, the price of labor and material, etc. All these questions are answered by a science, itself an important branch of political science, called statistics.

Other men are engaged in drawing up plans for forwarding passengers and goods, and a new list of charges for their transport—a tariff. Of what does the man think who is making a new railroad tariff? He is reflecting upon how it comes that one kind of goods of the same weight is able to endure a higher charge than another; or, how the number of passengers often remains constant while the price for carrying them changes, and how this number changes often while the price of tickets remains unchanged. Is it possible to change this by new rates? Certainly. How far? That is precisely the question which it is difficult to answer. Whence shall he obtain the data to justify his new proposals? Will it ever be possible to obtain certain and precise answers to these questions without a knowledge of the conception and functions of the first-cost of an undertaking, of profits of managers, of price, market-price, competition, etc.? And where is one to obtain an adequate knowledge of these conceptions and their constant reciprocal action, to the elementary power of which all economic life must bend, whether that of railroads or other undertakings?

Another railroad man holds a newspaper in his hand. He is reading about the agricultural products of America and Australia. He is reading about shipments of grain from Canada to Marseilles; about shipments of meat from New York or Montevideo to Glasgow; or London; or Havre; or he is reading about the price of American pork in Vienna. Of what consequence is all that to him? But, beside him lies his report of business for the last month, and that shows him that he has transported less grain than usual to Switzerland, to the Rhine, to South France. Why? The price of grain was too low. Why? Because the Americans can raise it more cheaply. But why have they not always provided Europe with grain? The cost of transportation was too great; now it is cheaper. New computations must be made. The cost of production over the whole world becomes a condition for the amount he is able to charge.

But what science teaches the railroad man to reason intelligently about these and a thousand other things of vital importance to him? It is political economy.

Besides these two branches of political science, it would be easy to extend our inquiries to the science of finance and the science of administering the law—administrative science. Political science assigns to railroads their proper place in that whole called the state.

Dr. Stein thought that the universities should establish a two-years' course of study for those who intend to devote their lives to railroad work. The studies of the first year would include the general principles of the different branches of political science. Statistics, political economy, public finance, administrative law; also a course of lectures upon the general principles of law and another upon the history of law. The second year would be taken up with more special studies. In the place of the general principles of statistics a course of lectures should be established upon the statistics of production and transportation within the home country, in Europe and in the whole world, with the use of large statistical maps. Instead of the general principles of political economy we should have the science of transportation, of commercial roads and ways, of balance of trade, of market price, etc., in their relations especially to canals and railroads. It would also be necessary to teach book-keeping as a science, the history of the world's commerce, the history of railroads, the science of taxation and administrative law as applied to railroads. Nor should we omit the relations of railroads to the postal system of the country and the relations of the police to railroads; commercial law and the study of tariffs or rates as a science ought not to be overlooked. A two-years' course of study, with three hours daily of lectures and recitations, would be sufficient. The faculty should be composed of professors of law and political science and railroad specialists.

Distribution of St. Louis Shipments Among Trunk Lines.

From a circular, issued by Commissioner Fink, it appears that the percentages of the total St. Louis shipments, from the establishment of the pool to the end of last October, received by each of the trunk lines from each of the roads leading east from St. Louis, was as follows:

	Grand N. Y.	Trunk Central.	Erie.	Penna.	B. & O.	Total.
Chicago & Alton.....	5.94	11.08	3.41	0.00	0.00	20.43
Wabash.....	0.81	13.31	3.87	0.00	0.00	18.57
Ind. & St. Louis.....	0.10	13.91	3.45	0.50	0.01	20.96
Vandalia Line.....	0.50	0.03	4.09	12.21	0.01	18.34
Ohio & Miss.....	0.14	0.48	2.25	0.01	14.17	17.05
Total.....	7.49	42.47	17.00	12.87	14.71	95.08

The balance of about 5 per cent. is probably the shipments to points of junction with the trunk lines or competitive points further west. Considering that the Pennsylvania has the shortest route to New York and Philadelphia, and a route nearly as short as the shortest (953 against 920 miles) to Baltimore, it is somewhat remarkable that it has a smaller share of the St. Louis shipments than any other of the trunk lines except the Grand Trunk, and considering the circuitous route of the latter from a point so far south (1,517 miles from St. Louis to Boston, against 1,168 by way of Cleveland or Toledo), it is surprising that that road has so much (the part of it considered a "trunk line," being east of Toledo, so that its share of the business between Detroit and Buffalo is not credited to it in the above table).

The New York Central, it appears, gets the larger part of the shipments by three of the five St. Louis roads; the Pennsylvania and the Baltimore & Ohio depend almost exclusively upon the lines which they control; while the Erie's proportion is made up of a moderate contribution from each of the five roads, the Pennsylvania's Vandalia Line supplying most and the Ohio & Mississippi least. The New York Central has two and a third times as much as the Erie, which has more than any other trunk line. These roads are not the shortest but the longest routes to New York, but the New York Central gives the shortest route to Boston and to most of New England.

It should be remembered that the total St. Louis shipments are very much less than the Chicago shipments. One per cent. of the latter is probably equal to more than 4 per cent. of the former.

Protecting Timber From the Terebo.

The use of preserved wood for railroad purposes has formed the subject of several articles in this journal, where the question has been discussed from an economic point of view, and the experience both in this country and Europe given to our readers. The value of effective methods of wood preservation, however, is dependent upon the cost of timber. In those parts of the country where ties and bridge timber can be had at very low prices, preservative means are of not much importance; but the forests are being rapidly cut away, so that even where, a few years ago, timber was abundant, now the question of a supply of railroad timber begins to be one which causes anxiety to railroad men. But where the supply is scanty and timber must be hauled long distances, or must be put in place at considerable cost, any method which promises to double or treble the life of timber is worthy of careful study and experiment. The question of the present first cost should not deter railroad managers from experimenting upon a sufficient scale to test, under their own observation, the value of such methods as are available. It is said, we know, that ties are destroyed not by decay, but by the mechanical action or the cutting of the rail, and therefore that no preservative process would add materially to the life of ties, especially on lines with a heavy traffic; but the advocates of the use of preserved ties claim that such wood does not cut under

the rail, and experience certainly indicates that soft ties when preserved have gained immensely in life in Europe. Whether a like result would be attained by using preserved ties with rails laid as they are in this country has never been fully demonstrated. Experience indicates, though, that the capacity of ties to resist abrasion, as well as decay, is very much increased if the preservative process employed is a good one and the ties are thoroughly treated. The question is so important, however, that the truth of the often made, but perhaps erroneous, statement, that "ties cut out before they rot," should be ascertained beyond doubt. Timber is also largely used on railroads in places where there is very little wear, but it is only subject to destruction from decay. Here certainly is a hopeful field for experiment.

But, however the views of engineers may differ as to the efficacy of the different methods in preserving wood from decay, there seems to be very little doubt in the minds of those conversant with the subject that creosoted timber will not be attacked by the teredo. This fact is important to most railroads approaching the seaboard. The teredo is more or less active along the whole seacoast, except at the mouths of large fresh-water rivers, and is especially destructive in Southern waters.

The wood-cut herewith represents two sections of a spruce pile, one creosoted at the Hayford Creosoting Works, at Elizabethport, N. J., and the other a piece of the same pile in its natural state. The two pieces are fastened together by cleats of creosoted hemlock, and further protected by a chain. The block on the left shows a cross-section of the creosoted block. These blocks were exposed in the sea at the mouth of Cape Fear River during one year.

This illustration has a twofold interest. The unprepared block on the left, which originally filled all the space between the cleats, and is now more like a sponge than wood, riddled through and through by the teredo, shows how terribly destructive the teredo is in Southern waters. And the creosoted block, the cross-section of which shows that not a single bore has been pierced in it, is conclusive evidence of the value of the process. It may be stated, in answer to the objection that this has been tested but a single year, that creosoted piles have been used in Europe for 30 to 40 years, and many are still doing service in teredo-infested waters which were driven so long ago, and are still as sound as at first. This is to be expected, since the creosote oil is insoluble in water, so time has no effect upon piles treated with it. In creosoted piles, exposed in the Gulf of Mexico during seven years, when cut the oil seemed to be in a limpid state, and the odor from it as pungent as at first.

During a few years past, many thousand creosoted piles have been driven in the sea in various parts of this country whose record, as far as we have been able to learn, has been entirely satisfactory. When the New Orleans & Mobile Railroad was first built several miles of bridges and trestles were constructed of untreated pine piles. It is said that many of these were riddled by the teredo and broke off before the rails were laid over them. The importance of protecting them in some way was apparent, so the company erected works for creosoting and has renewed all the bridges and trestles with creosoted pine, thoroughly treated, which is doing excellent service and has not been touched by the teredo at all. The new ferry house at Hoboken, N. J., was erected the past summer on 1,000 creosoted piles. At that point untreated piles were cut off by the teredo in from 6 to 10 years. Other creosoted piles have been used in government work, in Charleston, S. C., and in New Jersey.

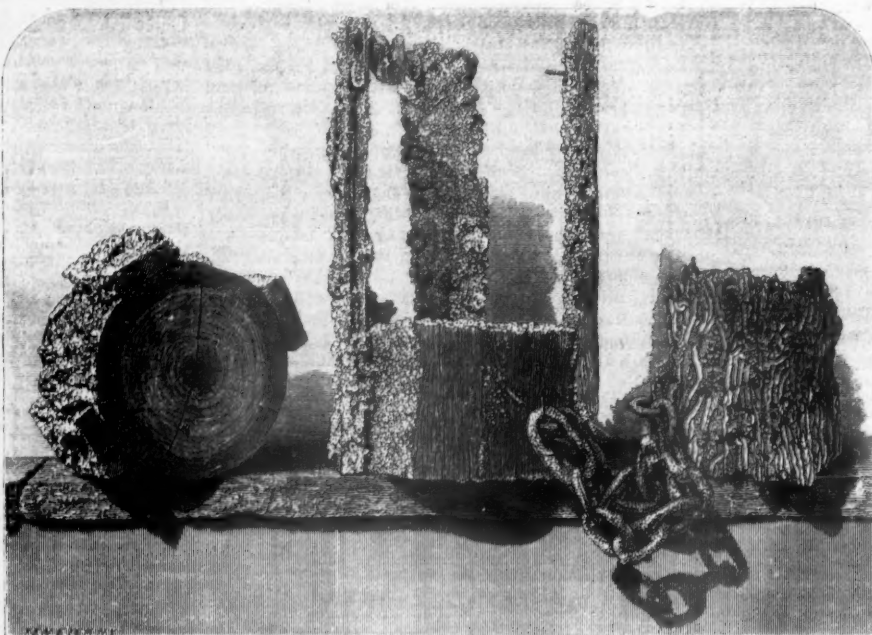
It is said that no substance for injection into wood has yet been discovered which will protect it from the teredo except creosote oil. Various substances have been tried, including poisonous salts, which have been proved valuable in preserving wood from decay, but the teredo does not seem to avoid them. Many years ago a commission was appointed in Holland, which made a careful study of the subject and experimented with every suggested method, but it is reported, found nothing would answer except creosote, which was adopted for all government work, and is used with entire success. In England, also, and in France and Belgium, it is said that no wood has been used during the past 30 years in marine construction which had not been previously injected with 10 lbs. of creosote oil per cubic foot.

Creosoting timber is costly, perhaps, at the outset, but a real economy in the end. In marine work the labor is generally an important factor in the cost, so that even where lumber is abundant, as in the South, it is wasteful and costly not to take the precaution to make the timber last longer than the three or four years which is usually the total life in Southern waters without protection. Mechanical means are sometimes adopted, such as sheathing with sheathing metal or copper, but these are only temporary and a great temptation to river thieves. Sheathing is a protection so long as it remains intact, but with the slightest break in the metal its usefulness is gone. Moreover, the

cost is greater than that of creosoting. Covering the surface with copper and, perhaps, iron nails also, is a protection, but they must have broad heads and be driven so closely as not to leave any portion of the surface exposed. But this plan is usually more expensive than creosoting.

Wool Traffic from the Pacific Coast.

The largest single item of freight eastward over the Pacific railroads is wool, exceeding in tonnage tea and wine. The product of the state in 1880 is reported to have been 46,074,200 lbs., of which 44,563,800 lbs. were received at San Francisco, and the balance shipped direct to the East. Besides this San Francisco received 7,022,500 lbs. from Oregon, and 275,000 from foreign sources. It appears thus that substantially the whole wool traffic of the Pacific railroads originates on the Pacific coast, and none of the large Australian production seeks a market by this route. As the traffic is chiefly concentrated at San Francisco, probably a new railroad to that city would command a full share of the traffic, if the relation between through and local rates should be maintained; but as the Central Pacific owns nearly the whole railroad system of California, it probably would, if it had a rival at San Francisco, make the rates from its local points to the



East and to San Francisco such that there would be an advantage in shipping directly to the East, in which case the Central Pacific would get the long haul, rather than to San Francisco, where the Central Pacific would have to compete with another road for the shipment to the East.

About 13 per cent. (3,511 tons) of Pacific coast production arrived from Oregon and Washington, and this portion, and this only, the Northern Pacific will be in better position to command than the Central or Southern Pacific—a little more than a car-load a day.

Wool is the only important agricultural product of the Pacific coast that reaches the Eastern or European market by rail—nearly all the wheat and most of the wine goes by sea around Cape Horn. Of 51,671,700 lbs. of wool marketed in 1880, 9,055,400 were consumed in California, and of the 42,616,300 lbs. that were shipped, 71 per cent. went by rail, amounting to 15,190 tons, or about five car-loads daily. This, it must be remembered, is usually the largest single item of east-bound freight over the Central Pacific. In some years, however, barley shipments of greater weight have been made. Barley and not wheat is carried, because the market for barley is in the West, and it does not have to be carried more than two-thirds of the way across the continent, while the market for California wheat is exclusively in Europe; and it is delivered there from San Francisco by vessels around Cape Horn at much less than a rail rate from San Francisco to New York based even upon the low trunk line rates from Chicago to New York. The latter last summer would have amounted to about 74 cents per bushel from San Francisco to New York. The vessels carry from San Francisco to Liverpool at rates varying from about 25 to 38 cents.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:
Texas & St. Louis.—Extended from Trinity River, Tex., west by south to Corsicana, 25 miles. Gauge, 3 ft.
This is the first new track reported for 1881.

THE AMERICAN INSTITUTE OF MINING ENGINEERS will hold its next annual meeting in Philadelphia, beginning Tuesday evening, Feb. 15. One of the chief subjects of discussion at this meeting will be steel rails. Mr. Sandberg's paper on "Rail Specification and Rail Inspection in Europe," which was read at the Lake Superior meeting, will come up for discussion, and Dr. C. B. Dudley, will present a paper on the "Wear of Steel Rails in relation to their Chemical Composition and Physical Properties," which will supplement

the paper on the same general subject which he read some two years ago, and which has attracted a great deal of attention here and abroad. The programme of the meeting is not yet completed, but it will include visits to the Midvale Steel Works, the Penoyd Iron Works, etc., and receptions at the Academy of Fine Arts and at the Penn. Club.

NEW PUBLICATIONS.

The Mechanical Engineer.—The first numbers of this "illustrated weekly devoted to applied mechanics and the arts," which is published by Egbert C. Watson & Son, No. 5 Beekman street, New York, has been received. It has eight pages, 10½ x 14 in., well printed and copiously illustrated. The editor Mr. Watson is an experienced mechanical engineer, and was formerly editor of the *Scientific American*, and, therefore, brings experience with him in his new venture. There is certainly a field for a paper of this kind in this country, but to succeed it must occupy ground somewhat different from that which is cultivated by old established publications.

The publishers announce it as their intention to make a thoroughly "practical, common-sense, orthodox mechanical paper," and say that "it is not an advertising sheet," although they admit that they "are obliged to take some advertisements, in order to keep up steam." It may be inferred, then—to use an engineering simile—that it is not a full-stroke advertising sheet, but that that department is worked with a cut-off. With the hope that the proprietors will succeed in getting a high "duty" out of their new venture, and commending it to the consideration of all mechanical engineers, we will leave them to judge whether it is "orthodox" or not.

Governor's Messages on Railroads.

The Governor of Illinois, who has just begun his second term, says:

"The annual report of the Railroad and Warehouse Commissioners will be found to contain a comprehensive statement of the condition and operations of the railroads in this state more than ever before. This vast interest, whose annual gross earnings are nearly \$50,000,000, and which employs over thirty-two thousand persons in our state, and in which every citizen is interested, either as taxpayer, stockholder or patron, which enters into and concerns every business interest, necessarily demands the careful study and attention of the law-maker.

"The past year has been an unusually prosperous one for railroads. Their business has been immensely enlarged and their earnings increased. Very many have come out of a condition of insolvency or serious financial embarrassment, and have been reorganized under hopeful auspices. The present favorable condition of these corporations is the result of great business activity and general prosperity.

"The power of the state to enforce proper regulations upon common carriers to prevent extortion and unjust discrimination, and provide for public safety, is now established and admitted. It has been recognized and affirmed by the highest courts in the land. In the exercise of this power, in the light of the experience of older communities as well as our own, the necessity of a tribunal like the Railroad and Warehouse Commission is now generally recognized. Through their agency the relations between the public and the railways are becoming better understood, and many evils have been reformed. I hope that, under the influence of public opinion, enlightened by the investigations of the Commissioners and directed by the decisions of the courts, the railroads will adopt such a policy as will make their relations with the public entirely harmonious."

The Governor of Tennessee recommends the establishment of a Railroad Commission for that state, "charged with the assessment of the rail-ads of the state and investigation of their freight and passenger rates, and clothed with such powers as may be necessary to enable it to enforce justice and equality and the regulation of their freight and passenger rates."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Indianapolis & St. Louis, annual meeting, at the office in Indianapolis, Feb. 16.
Indiana, Bloomington & Western, special meeting, in Indianapolis, March 15.
The *Philadelphia & Reading* meeting is now called for March 7, but the time may be changed by the Court.

Dividends.

Dividends have been declared as follows:
Oregon Railway & Navigation Company, 2 per cent., quarterly, payable Feb. 1.
Panama, 5 per cent., quarterly, payable Feb. 1. This company increases from 4 to 5 per cent.
Illinois Central, 3½ per cent., semi-annual, payable March 1. This company increases from 3 to 3½ per cent.

Foreclosure Sales.

The *Atlantic, Gulf & West India Transit* road will be sold in Fernandina, Fla., Feb. 7, under a decree of the United States Circuit Court. It is understood that an agreement has been made among the creditors of all classes, and that the road will be bought in by the present owners. The road, originally the Florida Railroad, extends from Fernandina to Cedar Keys, 154 miles. The present company has refused to make any statements whatever of its operations.

ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—The following appointments are announced on this road: Cabell Breckenridge, Engineer in charge of road-bed, bridges and structures; H. Y. Hall, Road-Master; M. J. Meehan, Master Mechanic in charge of motive power, machinery and cars.

Atlanta & Alabama.—This company has been organized by the election of the following directors: John Collier, B. E. Crane, J. F. Cummings, J. W. English, E. P. Howell, S. M. Inman, R. C. Mitchell, Anthony Murphy, R. D. Spaulding. The board elected Anthony Murphy President; J. F. Cummings, Vice-President; W. T. Newman, Attorney; H. Castleman, Secretary. Office in Atlanta, Georgia.

Backman Valley.—At the annual meeting in Hanover, Pa., Jan. 10, the following officers were chosen: President, A. W. Eichelberger; directors, Joseph Althoff, Joseph Delone, Levi Dubs, J. W. Gitt, E. W. Heindel, C. L. Johnson, Stephen Keefe, Adam Newcomer, Percy Pine, Henry C. Schirner, Edwin Thomas, Samuel Thomas. The road is worked by the Hanover Junction, Hanover & Gettysburg Company.

Baltimore & Cumberland Valley.—At the annual meeting in Chambersburg, Pa., Jan. 10, the following directors were chosen: David Wills, J. M. Hood, A. Rieman, D. J. Foley, C. W. Humrichouse, W. L. Chambers, J. P. Culbertson, George B. Coie, John W. McPherson. The road is controlled by the Western Maryland Company.

Berlin Branch.—At the annual meeting in Abbottstown, Pa., Jan. 10, the following officers were chosen: President, A. W. Eichelberger; directors, Wm. Bittinger, G. W. Diehl, Stephen Keefe, W. S. Hildebrand, Samuel Meisenbeler, Jacob Resser, A. W. Storm, Robert M. Wirt, Joseph Wolf; Secretary, A. W. Storm; Treasurer, Jacob Resser. The road is leased to the Hanover Junction, Hanover & Gettysburg Company.

Bradford, Kinzua & Smithport.—At the annual meeting, Jan. 11, the following directors were chosen: W. W. Brown, J. W. Humphrey, Bradford, Pa.; Henry Hamlin, Smithport, Pa.; John J. Carter, H. F. Sweetzer, Titusville, Pa.; W. S. Bissell, R. G. Taylor, B. C. Williams, Buffalo, N. Y.; R. C. Vilas, New York. The board elected W. W. Brown, President; R. G. Taylor, Vice-President; B. C. Williams, Secretary and Treasurer.

Buffalo, Bradford & Kinzua.—At the annual meeting, Jan. 11, the following directors were chosen: W. W. Brown, John A. Read, Bradford, Pa.; John J. Carter, B. N. Hurd, H. F. Sweetzer, Titusville, Pa.; R. G. Person, East Aurora, N. Y.; W. S. Bissell, R. G. Taylor, B. C. Williams, Buffalo, N. Y.; R. C. Vilas, New York. The board elected John J. Carter, President; R. G. Taylor, Vice-President; B. C. Williams, Secretary and Treasurer.

Champlain Transportation Co.—At the annual meeting last week the following directors were chosen: Le G. B. Cannon, I. V. Baker, V. P. Noyes, Geo. B. Chase, Z. V. K. Willson, A. L. Inman, Russell S. Taft. The board elected Le Grand B. Cannon, President; I. V. Baker, Vice-President; P. W. Barney, Clerk and General Superintendent; V. P. Noyes, Treasurer; E. Root, Chief Engineer.

Chicago, Milwaukee & St. Paul.—Mr. F. C. Butterfield has been appointed Master Mechanic of the Iowa & Dakota Division. He was formerly on the St. Paul & Sioux City road.

Cleveland, Columbus, Cincinnati & Indianapolis.—The following notices have been issued by General Road-Master G. M. Beach:

"W. C. Irwin has this day been appointed Engineer of Bridges of this road. Mr. Irwin will have charge of and be responsible for the condition of all bridges, culverts, trestle-work and structures of like character, and will at once enter upon the discharge of said duties, with head-quarters at Cleveland.

"M. Bowen has been appointed Road-Master of Division A, from Cleveland to Columbus, to take effect Jan. 11, 1881, vice W. C. Irwin, appointed Engineer of Bridges."

Dayton & Southeastern.—At the annual meeting in Dayton, O., Jan. 11, the following directors were chosen: E. E. Mead, John K. McIntire, W. P. Callahan, T. A. Legler, J. D. McKee, M. C. Allison, F. C. Trebelin, A. J. Christopher, John L. Persinger, Daniel McLean, Wm. J. Ingham, John C. Enteklin, H. S. Willard, Wm. Clarke, S. F. Secrist. The new directors are J. D. McKee, S. F. Secrist and William Crane, chosen in the place of Messrs. Robert I. Cummin, George C. Rittenour and H. F. Austin.

Delaware.—At the annual meeting in Dover, Del., Jan. 13, the following directors were chosen: S. M. Felton, Isaac Hinkley, A. C. Grav, Charles Warner, Christian Febiger, Edward Brighurst, Jr., Isaac Jump, H. B. Fiddeman, Manlove Hayes, Alexander Johnson, James J. Ross, Albert Curry, J. Turpin Moore. The board re-elected Samuel M. Felton, President; Manlove Hayes, Secretary and Treasurer. The road is leased to the Philadelphia, Wilmington & Baltimore Company.

Delaware River & Lancaster.—At the annual meeting in Lancaster, Pa., Jan. 10, the following were chosen: President, Robert Crane; Directors, Christian S. Kauffman, D. Brainard Case, Dr. John K. Lineaweaver, Dr. Henry Carpenter, N. H. Anders, Dr. Robert M. Bolinius, John D. Skiles, John S. Roland, Isaac A. Guldin, Alexander Sellers, E. D. White, Samuel K. Cassel; Secretary, D. Brainard Case; Treasurer, Dr. Henry Carpenter.

Engineers' Club, of Philadelphia.—The following standing committees have been appointed for the year 1881: Finance, F. Graff, J. J. de Kinder. Membership, J. J. de Kinder, George Burnham, Jr. Publication, Rudolph Hering, George Burnham, Jr. Library, T. M. Cleemann, F. Graff.

Evansville, Dayton & Eastern.—The directors of this new company are: H. S. Bennett, Wm. E. Bird, Lewis Foltz, S. P. Gillett, J. A. Lemcke, Evansville, Ind.; Wm. Archer, Charles H. Clark, J. L. Davis, G. W. Sturgis, New York. The board has elected Wm. E. Bird President; Lewis Foltz, Secretary and Treasurer.

Fitchburg.—The following circular is dated Boston, Jan. 10:

"Mr. J. E. Tucker is appointed General Freight Agent, vice Mr. C. L. Hartwell, transferred to other duties. Mr. C. L. Hartwell is appointed Freight Auditor, vice Mr. C. A. Wetton, resigned. Offices in passenger depot of the company, Boston, Mass. Appointments take effect Feb. 1, 1881."

Hannibal & Southwestern.—The directors of this new company are: J. T. Barber, A. T. Davis, D. M. Delany, Wm. M. Ely, J. H. Garth, J. R. Hall, J. T. Hawkins, J. T. K. Hayward, J. M. Jursket, W. H. Loomis, C. Voorhees, R. S. Whitte. Office in Hannibal, Mo.

Illinois Railroad Commission.—The Governor of Illinois has nominated as Railroad and Warehouse Commissioners, William M. Smith, of McLean County, and George M. Bogue, of Cook County, to be their own successors, and Wm.

H. Robinson, of Wayne County, as successor of John H. Oberly, whose term has expired.

Kansas, Arizona & Pacific.—The directors of this new company are: S. T. Emerson, Alfred Ennis, Charles M. Hays, James A. Hill, W. A. Johnston, Thomas J. Porter, Wm. Spriggs, A. A. Talmage, Charles G. Warner. A majority of them are connected with the Missouri Pacific.

Kansas City Union Depot Co.—The following officers were chosen last week: President, George H. Nettleton; Secretary, W. J. Farrey; Treasurer, C. C. Ripley; Superintendent, H. Hale; Executive Committee, G. H. Nettleton, S. F. Smith, A. A. Talmage.

Lehigh Valley.—At the annual meeting in Philadelphia, Jan. 13, the following were chosen: President, Charles Hartshorne; Directors, James I. Blaklee, Wm. L. Conyngham, Wm. A. Ingham, George B. Markle, Harry E. Packer, Robert A. Packer, Ario Pardee, Joseph Patterson, Robert H. Sayre, David Thomas, Ashbel Welch, Elisha P. Wilbur. There is no change from last year.

Louisville, Cincinnati & Lexington.—The following circular, from General Superintendent Mahl, is dated Louisville, Ky., Jan. 8:

"George C. McMichael has this day been appointed Assistant Road-Master. He will have the direct supervision of the track and road-bed of the lines operated by this company. His orders will be respected accordingly."

Marion & Indianapolis.—The directors of this new company are: Eli Jordan, James F. McDowell, James Brownlee, Elijah Kitch, William Garner, Pierce Norton, Marshall T. Tingley, Jonathan W. Parsons, John Brownlee.

Midland North Carolina.—At a meeting held in Newberne, N. C., last week the following directors were chosen: Lewis Coleman, Laban Pratt, Frederick Davis, Wm. S. Denny, Boston; Henry S. Ferbel, Wm. J. Best, Robert W. Furguson, A. V. Stout, John W. Little, New York; Richard H. Taylor, Washington; J. M. Worth, John S. Henderson, Jas. A. Bryan, John Manning, W. B. Duncan, A. Oaksmith, North Carolina. The board elected Wm. J. Best, President; Lewis Coleman, Vice-President; Wm. S. Denny, Treasurer.

Missouri & Arkansas.—At the annual meeting last week the following directors were elected: Powell Clayton, L. M. Lloyd, J. T. McElheny, W. H. Stein, James Torrens. The new board organized by electing Powell Clayton, President; J. T. McElheny, Secretary; W. H. Stein, Treasurer.

Missouri, Arkansas & Southern.—At a recent meeting the following officers were chosen: President, C. W. Rogers, St. Louis; Vice-President, John O'Day, Springfield, Mo.; Secretary and Treasurer, T. W. Little, Fayetteville, Ark. Mr. Rogers is General Manager of the St. Louis & San Francisco road.

New Haven & Northampton.—The board has re-elected Charles N. Yeamans, President and Superintendent; George St. John Sheffield, Vice-President; Edward A. Ray, Secretary and Treasurer.

New York City & Northern.—At the annual meeting in New York, Jan. 13, the following directors were chosen: C. F. Woerishoffer, Henry Villard, E. P. Fabbri, A. Lichtenstein, A. Hegewisch, R. M. Galloway, G. P. Lowrey, J. F. DeNavarro, Lewis Roberts, Lewis May, Joseph S. Stout, Wm. Endicott, Jr., Horace White.

New York Elevated.—The new board has re-elected Cyrus W. Field, President; John D. Mairs, Vice-President; James A. Cowing, Secretary and Treasurer; Thomas Gerehart, Assistant Secretary and Treasurer.

New York, Ontario & Western.—At the annual meeting in New York, Jan. 19, the following directors were chosen: Wm. Adams, Jr., Henry Amy, Fred. Butterfield, Charles J. Canda, E. E. Chase, Thomas C. Clarke, Wm. H. Fenner, Theodore J. Houston, Conrad N. Jordan, Horace H. Porter, Jacob H. Schiff, E. F. Winslow, C. J. Woerishoffer. The board elected Gen. E. F. Winslow President.

Norwich & Worcester.—At the annual meeting, Jan. 12, the following directors were chosen: Francis H. Dewey, George W. Gill, Charles W. Smith, Edward L. Davis, Worcester, Mass.; John F. Slater, Norwich, Conn.; Wm. F. Weld, Boston; W. Bayard Cutting, New York. The board re-elected Francis H. Dewey, President; Edward T. Clapp, Clerk; George L. Perkins, Treasurer; P. St. M. Andrews, Managing Agent under the lease. The road is leased to the New York & New England Company.

Ohio & Baltimore Short Line.—At the annual meeting, Jan. 10, the following were chosen: President, J. B. Washington, Pittsburgh; directors, W. W. Smith, Wm. Workman, Dr. Thomas McKennan, Henry M. Dougan, Washington, Pa.; Wm. Keyser, T. Harrison Garrett, John K. Cowen, Baltimore. The board re-elected W. W. Smith, Secretary; W. H. Ijams, Treasurer; W. T. Thelin, Auditor; James L. Randolph, Chief Engineer. The company is controlled by the Baltimore & Ohio.

Ohio Central.—The following officers have been chosen: President, D. P. Eells, Cleveland, O.; Vice-President, Samuel Thomas, Toledo, O.; Secretary and Treasurer, B. G. Mitchell, New York.

Peachbottom.—At the annual meeting in York, Pa., Jan. 10, the following were elected: President, Charles R. McConkey; Directors, W. Latimer Small, Michael Schall, William Wallace, A. C. Manifold, William G. Ross, John Humphrey, Samuel Dickey, John A. Alexander, Robert B. Patterson, J. Penrose Ambler, Charles H. Stubbs, Isaac Bradley.

Pennsylvania Company.—At a meeting of the board of directors of this company, held Jan. 11, the following officers were elected: S. B. Liggett, Secretary, in place of Clifford Stanley Sims, resigned, and Stephen W. White, Assistant Secretary, in place of S. B. Liggett, appointed Secretary; both appointments to take effect Feb. 1.

The Secretary's office will be at the general office of the company, Pittsburgh; that of the Assistant Secretary at No. 233 South Fourth street, Philadelphia.

Pennsylvania Leased Lines.—At the annual meetings last week officers were chosen as below by the following companies, whose roads are leased to the Pennsylvania Railroad Company: **Bald Eagle Valley.**—President, L. A. Mackey; directors, Thomas A. Scott, Andrew G. Curtin, John Irwin, Sr., James Gamble, C. A. Mayer, George B. Roberts, John P. Green, James Duffy, Strickland Kneass, J. N. DuBarry; Secretary and Treasurer, Edmund Blanchard. **Tyrone & Clearfield.**—President, J. N. DuBarry; directors, John P. Green, Strickland Kneass, Wistar Morris, J. B. Roberts, N. P. Shortridge, Edmund Smith. **Moshannon & Clearfield.**—President, J. N. DuBarry; directors, John P. Green, Strickland Kneass, Wistar Morris, G. B. Roberts, N. P. Shortridge, Edmund Smith. **Riverfront.**—President, Strickland Kneass; directors, George B. Roberts, J. N. DuBarry, Wistar Morris, S. M. Felton, Josiah Bacon, N. P. Shortridge, Ed-

mund Smith, A. J. Cassatt; Secretary and Treasurer, James R. McClure. **Germantown & Chestnut Hill.**—President, G. B. Roberts; directors, Josiah Bacon, A. J. Cassatt, G. Morris Dorrance, John P. Green, Strickland Kneass, N. P. Shortridge. **Philadelphia & Merion.**—President, G. B. Roberts; directors, Josiah Bacon, R. D. Barclay, J. N. DuBarry, John P. Green, Strickland Kneass, Joseph Lesley, Wistar Morris, Henry M. Phillips, Thomas A. Scott, N. P. Shortridge, Edmund Smith, Wm. M. Spackman.

Pittsburgh, Cincinnati & St. Louis.—At a meeting of the board of directors of this company, held Jan. 11, the following officers were elected: S. B. Liggett, Secretary, in place of Clifford Stanley Sims, resigned, and Stephen W. White, Assistant Secretary, in place of S. B. Liggett, appointed Secretary; both appointments to take effect Feb. 1.

The Secretary's office will be at the general office of the company, Pittsburgh; that of the Assistant Secretary at No. 233 South Fourth street, Philadelphia.

Portland & Ogdensburg.—At the annual meeting in Portland, Me., this week, the following directors were chosen: Samuel J. Anderson, J. P. Baxter, J. Eastman, Francis Fessenden, H. N. Jose, W. F. Milliken, R. M. Richardson, J. S. Ricker, W. W. Thomas, Jr., Samuel Waterhouse.

Rutland & Whitehall.—This company has elected W. W. Cook, President; I. V. Baker, Vice-President; Charles R. Allen, Clerk; Ira C. Allen, Treasurer. The road is leased to the Delaware & Hudson Canal Company.

St. Louis & San Francisco.—Mr. T. B. Caldwell has been appointed Southern Passenger Agent, with head-quarters in Nashville, Tenn. He was recently on the Indianapolis & St. Louis.

Springfield, Effingham & Southeastern.—At the annual meeting recently the following directors were chosen: D. M. Billings, W. P. Black, E. Pratt Buell, J. J. Funkhouser, J. B. Lyon, D. W. Odell, G. N. Parker, Thomas B. Rice, Wm. Sturgis.

Toledo, Delphos & Burlington.—Mr. N. S. Hotchkiss, Foreman of Bridges and Buildings, is appointed also Road-Master, with office at Delphos, O., in place of E. R. Campbell, resigned.

Utica, Clinton & Binghamton.—At the annual meeting in Utica, N. Y., Jan. 18, the following directors were chosen: R. S. Williams, Isaac Maynard, George B. Phelps, F. D. Beebe, W. M. Storrs, John Thorn, W. S. Bartlett, Henry Hopson, A. W. Reynolds, James I. Scollard, J. W. Lippitt, D. W. Ingalls, Allen Curtis. The road is worked by the Delaware, Lackawanna & Western.

Vermont Railroad Tax Assessors.—Governor Farnham, of Vermont, has appointed S. M. Gleason, of Thetford, Albert Dwinell, of Calais, and Mason S. Colburn, of Manchester, as the State Board to appraise railroad property for taxation under the law of last year.

Virginia Midland.—The officers of this company, successor to the Washington City, Virginia Midland & Great Southern, are as follows: John S. Barbour, President; L. W. Reid, Secretary; W. H. Marbury, Treasurer; Peyton Randolph, General Superintendent.

Western Railroad Association.—At the annual meeting in Chicago, Jan. 11, the following directors were chosen: B. F. Ayer, Illinois Central; B. C. Cook, Chicago & Northwestern; A. L. Osborn, Michigan Central; T. J. Potter, Chicago, Burlington & Quincy; T. F. Withrow, Chicago, Rock Island & Pacific; T. B. Blackstone, Chicago & Alton; Charles Paine, Lake Shore & Michigan Southern; C. W. Rogers, St. Louis & San Francisco; S. S. Merrill, Chicago, Milwaukee & St. Paul; F. de Funiak, Louisville & Nashville; G. H. Nettleton, Kansas City, Ft. Scott & Gulf; J. C. Clarke, Chicago, St. Louis & New Orleans. The board elected officers as follows: President, B. F. Ayer; Secretary and Treasurer, J. H. Raymond; General Counsel, George Payson; Executive Committee, B. F. Ayer, B. C. Cook, A. L. Osborn, T. F. Withrow, T. B. Blackstone.

Wisconsin Peninsula.—The directors of this new company are: H. Ellis, Wm. Hoffman, D. M. Kelly, Timothy O. Howe, S. M. Marshall, George Richardson, M. P. Skeltz, Henry Strong. Office at Green Bay, Wisconsin.

PERSONAL.

—Baron von Weber, who visited the United States last summer to study our river improvements and narrow-gauge railroads and report to the Prussian Ministry of Public Works, on his return was named Privy Councillor by the Emperor.

—Mr. D. B. Robinson, formerly on the Central Vermont, and for some years past Superintendent of the New Orleans & Mobile road, now the New Orleans Division of the Louisville & Nashville, lately resigned that position to accept the charge of the Sonora Railroad in Mexico, now under construction.

—Mr. Oliver Byrne, C. E., died in Maidstone, England, Dec. 9, aged 70 years. He had been in failing health some time. Mr. Byrne was the author of several engineering works, and notably editor of, and a large contributor to, *Spon's Dictionary of Engineering*, and the first edition of *Appleton's Dictionary of Mechanics*.

—It is reported in Boston that Mr. W. T. Hart has tendered his resignation as President of the New York & New England Company, in consequence of opposition from the New York element in the board. The report has been denied, but not officially. The board has taken no action on the resignation, if really offered, and Mr. Hart still retains the office.

—Hon. Thomas C. Platt, who will succeed Hon. Francis Kernan as Senator from New York, is General Manager, Secretary and a Director of the United States Express Company, and President of the Southern Central Railroad Company. One of his chief competitors in the Republican caucus was Hon. Chauncey M. Depew, General Counsel of the New York Central & Hudson River Company.

—Col. Charles P. Ball has resigned his position as General Superintendent of the Alabama Great Southern Railroad. He went to the road five years ago, having been previously on the Western Railroad of Alabama, and under his charge it has been practically rebuilt and placed in as good condition as any line in its neighborhood. When he took charge it was unsafe even for the limited business then done.

—Gen. W. J. Sewell, just nominated for United States Senator by the New Jersey Republicans, and who will in all probability be duly elected to that position next week, has for many years been Superintendent of the West Jersey Railroad and was lately promoted to be Vice-President of the company. He has served several years in the New Jersey Legislature, first in the Assembly and afterward in the Senate, and was twice President of the Senate.

—Mr. Fred. P. Mosely, Purchasing Agent of the Old Colony Railroad and the Old Colony Steamship companies, died

in Boston (Dorchester District), Jan. 8, of pneumonia. Mr. Morely was born in Dorchester, Sept. 20, 1826, and, after the annexation of that town, represented his section of the city in the state legislature for several years. He was formerly a member of the iron firm of Morely & Hodgman, of Boston. He was a popular and excellent citizen and his death will be widely regretted. He leaves a widow and four children.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods have been reported as follows:
Year ending Dec. 31:

	1880.	1879.	Inc. or dec.	P. c.
Ala. Gt. Southern ..	\$847,021	\$144,122	I. \$193,799	45.0
Cues. & Ohio	2,674,335	1,936,539	I. 737,796	38.7
East Tenn., Va. & Ga.	1,278,879	1,077,223	I. 201,656	18.7
Flint & Pere M.	1,507,445	1,148,024	I. 449,421	39.1
Ind. Bloom. & W.	1,223,007	1,160,743	I. 62,264	5.4
Nash., Chatta. & St. L.	2,040,449	1,800,878	I. 248,571	13.7
Eleven months ending Nov. 30:				
At. Miss. & Ohio ..	\$1,862,444	\$1,546,287	I. 316,157	21.7
Net earnings	865,780	657,311	I. 208,469	31.6
Bur. Cedar Rap. & No.	1,860,063	1,358,745	I. 501,318	36.9
Net earnings	655,546	470,073	I. 185,473	39.5
Ches. & Ohio	2,456,290	1,757,378	I. 698,912	39.7
Net earnings	508,101	370,992	I. 137,109	37.5
Chicago, Burling- ton & Quincy ..	10,015,078	13,341,548	I. 2,063,520	20.0
Net earnings	8,365,066	6,451,706	I. 1,743,360	26.0
Cleve., Mt. Ver. & Del.	380,539	351,754	I. 28,785	9.9
Net earnings	84,914	45,568	I. 39,346	85.5
Des Moines & Fort Dodge	288,030	201,170	I. 86,860	43.2
Net earnings	134,775	69,552	I. 65,223	95.0
Louisville & Nash.	8,519,073	5,325,575	I. 3,193,498	60.2
Net earnings	3,523,492	2,243,384	I. 1,280,108	57.4
Mem. Pad. & No.	196,128	144,940	I. 51,188	35.5
Net earnings	40,256	14,204	I. 26,052	186.1
New York, L. E. & Western	17,762,577	15,110,874	I. 2,651,703	17.7
Net earnings	7,057,005	4,597,948	I. 2,459,057	53.4
St. Louis, Iron Mt. & So.	5,608,646	4,637,197	I. 971,449	21.1
Net earnings	1,903,159	1,855,468	I. 47,691	2.6
Month of November:				
New York, L. E. & Western	\$1,707,337	\$1,515,834	I. \$281,503	18.8
Net earnings	745,604	558,197	I. 187,407	33.5
Month of December:				
Ala. Gt. Southern ..	\$61,669	\$53,475	I. \$8,194	15.5
Ches. & Ohio	218,070	179,161	I. 38,909	21.6
Cin. Ind. St. L. & Chi.	191,231	189,251	I. 1,980	1.0
E. Tenn., Va. & Ga.	116,830	118,830	D. 2,000	1.6
Flint & Pere M.	151,112	117,036	I. 34,076	29.1
Ind. Bloom. & W.	104,610	106,054	D. 1,444	1.4
Nash., Chatta. & St. L.	175,996	185,653	D. 9,657	5.2
Net earnings	60,991	.....	.....	.....
First week in January:				
Chi. & Eastern Ill.	\$29,087	\$14,077	I. \$15,000	113.6
Minn. & St. Louis ..	12,413	10,278	I. 2,135	20.9
Second week in January:				
Northern Pacific ..	\$24,983	\$18,378	I. \$6,605	36.6
Week ending Jan. 7:				
Great Western	\$80,070	\$90,874	D. \$10,804	13.3
Week ending Jan. 8:				
Grand Trunk	\$180,217	\$174,542	I. \$5,675	8.4

Coal Movement.

Anthracite coal tonnage reported for the week ending Jan. 8 was: 1881, 305,295; 1880, 351,290; decrease, 45,995 tons, or 13.1 per cent.

The following announcement, which gives the programme of the anthracite coal trade for the remainder of the present month, was made Jan. 17 to operators of the Schuylkill Region: "The anthracite coal interests have agreed to work full time during the present week, that is to say from Jan. 17 to 22 inclusive, and resume the stoppage of coal mining the last three days next week, that is to say, stop work on Jan. 27, 28 and 29. Ample notice will be given of any arrangements that may be made for restriction of mining in February."

"To carry out fully the spirit of the agreement it is essential that the mining, hoisting, preparation and loading of coal during those days be entirely discontinued, and it is earnestly hoped that the above agreement for suspension will be carried out by every one in perfect good faith."

This arrangement was made after several days' consultation by representatives of the companies.

Cumberland, Broad Top and Barclay tonnages for the week foot up 45,874 tons.

The official accountant's statement of anthracite tonnages for December and the year, differing somewhat in form from the weekly statements, is as follows:

	December.	Year.
Phila. & Reading ..	407,080	550,549
Lehigh Valley	369,533	360,156
Central of New Jersey	276,889	307,337
Delaware, Lacka. & Western	310,151	339,714
Del. & Hudson Canal Co.	213,009	270,219
Pennsylvania R. R. Co.	149,675	119,623
Pennsylvania Coal Co.	100,018	89,563
N. Y., Lake Erie & Western	46,473	31,243
Total	1,873,857	2,074,404

Decrease for the month, 195,547 tons, or 9.4 per cent.; for the year, 2,705,447 tons, or 10.3 per cent. Four companies show an increase for the month; only one, the Pennsylvania Railroad Company, has an increase for the year, though the decrease on the Lehigh Valley was very small.

The stock of coal on hand at tidewater shipping points on Dec. 31, 1880, was 500,273 tons, against 613,512 at the same time in 1879, and 501,377 in 1878.

The competitive tonnage, including all coal which for final consumption in transit reaches any point on the Hudson River or New York Bay, or which passes out of the capes of the Delaware (sea coal and dust excluded) was: 1880, 10,088,159; 1879, 11,813,798; decrease, 1,725,639 tons, or 14.6 per cent. This competitive tonnage was 43.04 per cent. of the total last year, and 45.18 per cent. the year before.

The total production was divided among the three great anthracite regions as follows in 1880:

	Tons.	P. c. of total.
From the Wyoming Region	11,418,270	48.73
" " Lehigh Region	4,463,221	19.05
" " Schuylkill Region	7,551,742	32.23
Total	23,437,242	100.00

The decrease in tonnage was greatest from the Schuylkill Region, the chief carrier from which is the Reading road.

The quantity of coal and coke passed through the locks on the Monongahela River, above Pittsburgh, in 1880, was:

	1880.	1879.	Inc. or dec.	P. c.
Coal, bushels	94,048,350	65,588,000	I. 28,460,350	28.3
Coke, bushels	5,358,800	3,572,700	I. 1,786,100	49.2

Total

The quantity in 1880 was equivalent to about 3,396,000 tons, or say, 283,000 car-loads. Part of it was consumed in and about Pittsburgh, but a very large part went down the Ohio River.

The coal tonnage of the Pennsylvania Railroad for 1880, with one week (last in December) missing, was as follows, in tons of 2,000 lbs.:

	1880.	1879.	Inc. or dec.	P. c.
Anthracite	1,170,967	1,170,967	.....	.....
Semi-bituminous	2,083,846	2,083,846	.....	.....
Bituminous	2,039,458	2,039,458	.....	.....
Coke	1,794,549	1,794,549	.....	.....
Total	7,088,820	7,088,820	.....	.....

The last week in the year is usually a very light one and would probably make little difference in the totals.

Bituminous tonnages reported for the year are:

	1880.	1879.	Inc. or dec.	P. c.
Barclay R.R. & Coal Co.	465,979	364,807	I. 101,172	27.7
Allegheny Region, Pa. R.R.	206,417	202,730	I. 3,687	1.8
Penn. & Westmoreland	914,802	787,408	I. 127,394	16.2
West Penn. R.R.	281,494	211,305	I. 70,189	33.2
Southwest Penn. R.R.	32,130	42,133	D. 10,003	23.8
Pittsburgh Region, Pa. R.R.	549,166	538,537	I. 10,629	1.9
Total bituminous	2,537,048	2,147,020	I. 390,028	18.2

Coke tonnages reported for the year are as follows:

	1880.	1879.	Inc. or dec.	P. c.
Allegheny Region, Pa. R.R.	59,213	59,213	.....	.....
Penn. & Westmoreland	134,820	134,820	.....	.....
West Penn. R.R.	75,427	75,427	.....	.....
Southwest Penn. R.R.	1,107,294	1,107,294	.....	.....
Pittsburgh Region, Pa. R.R.	458,049	458,049	.....	.....
Total coke	1,835,403	1,835,403	.....	.....

Lake Superior Iron Ore.

The Marquette Mining Journal's yearly statement gives the shipments of iron ore over the Peninsula Division, Chicago & Northwestern *et cetera*. Escanaba for 1880 as follows:

	Tons.
Iron ore by lake	1,171,765
Iron ore by rail	57,235
Quartz by lake	8,400
Pig iron by lake	4,700
Total	1,242,100

The ore business of the Marquette, Houghton & Ontonagon road for 1880 was:

	Tons.
Iron ore carried to lake	689,007
Iron ore delivered to Chicago & N. W. at Negaunee ..	33,490
Iron ore delivered to local points	18,880
Pig iron	9,382
Total	750,769

The Mining Journal gives the total output of iron ore from the Lake Superior Region at 1,975,602 tons, an increase of 561,420 tons, or 39.6 per cent. over 1879. The production of pig iron from the furnaces in that region was 48,502 tons, against 39,593 tons the previous year.

Boston-New York Rate Agreement.

A dispatch from Boston, Jan. 18, says: "The agreement for an advance of passenger and freight rates, to go into effect on Feb. 1, was signed yesterday by the Metropolitan Steamship, the Boston & Providence, the Stonington, the New York & New England, the Old Colony, and the New York & New Haven companies. The Boston & Albany Company is not a party to the agreement, but, connecting with the New York & New Haven for passenger business, it is necessarily governed by the rates of that company. The advance in freight rates will be about 75 per cent. The passenger rates will be \$3 by the Sound lines after March 15, and \$4 after June 1, and \$5 by all rail lines for limited tickets."

Grain Movement.

For the week ending Jan. 14 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1874	3,027,412	.....	1,800,196
1875	1,611,271	.....	1,634,316
1876	1,760,946	946,652	1,641,770
1877	2,391,038	908,082	1,546,128
1878	1,987,853	1,185,085	2,062,375
1879	2,030,536	1,777,759	1,778,971
1880	2,867,056	1,920,097	3,401,835
1881	2,087,699	2,056,483	2,053,554

Compared with the corresponding week of 1880 there is this year a decrease of 22 1/2 per cent. in the receipts and an increase of 48 1/2 per cent. in the shipments of the Northwestern markets, with a decrease of 44 per cent. in the Atlantic receipts. The Northwestern receipts were a trifle greater than in the previous week, but with that exception and two others, are smaller than in any week of 1880. The Northwestern shipments, however, are 21 1/2 per cent. more than in the previous week, and are the largest since navigation closed, and larger than in any week of last winter until the last week of February. The Atlantic receipts were as small but once in 1880, once in 1879, and not at all in 1878.

Of the Northwestern receipts for the week Chicago had 42.2 per cent., St. Louis 15.8, Peoria 15.3, Milwaukee 13.6, Toledo 6.1, Detroit 4.5, and Cleveland 2.5 per cent.

Of the Atlantic receipts New York had 32 per cent., New Orleans 23.4, Baltimore 17, Boston 16.5, Philadelphia 7.9, Portland 1.9, and Montreal 1.3 per cent. The New York receipts have not been so small before for nearly a year, but there were three weeks last winter when they were smaller; to find as small receipts at Philadelphia we have to go back to July, 1877; there were four weeks in 1880 when Baltimore's receipts were smaller; on the other hand, New Orleans has not had so large receipts before since last September.

Exports from Atlantic ports for five successive weeks have been:

	Jan. 12.	Jan. 5.	Dec. 29.	Dec. 22.	Dec. 15.
Flour, bbls.	189,310	120,460	157,960	138,389	153,360
Grain, bush.	1,800,826	2,300,164	2,611,377	2,393,848	2,646,707

The grain exports of the last week are the lightest that have been reported since last spring at least; but for the eight weeks ending Jan. 12 the exports are not very different from those of the corresponding weeks of the previous year—an increase of 51 per cent. in flour, from 751,920 to 1,135,827 barrels, and a decrease of 5 1/2 per cent. in grain, from 23,180,082 bushels to 21,815,350. The increase in flour is equivalent to more than the decrease in grain. The grain exports show an increase of 16 per cent. in wheat and a decrease of 40 per cent. in corn. This is contrary to the usual course of things of late months, corn exports generally hav-

ing been larger and wheat exports smaller. The falling off in corn has been mainly in the last four of the eight weeks, during which the exports were not half as great as in the first four.

For the week ending Jan. 15, receipts and shipments at Chicago and Milwaukee were:

	Receipts.	Shipments.
Chicago	1881. 2,416,670	1880. 3,649,119
Milwaukee	1881. 676,002	1880. 982,100

For the same week, ending Jan. 15, receipts of grain in bushels and flour in barrels at the four leading Atlantic ports were:

	New York.	Boston.	Philadelphia.	Baltimore.
Grain	1881. 818,010	411,980	229,195	420,288
Flour	1881. 1,214,221	237,087	345,400	423,441
P. c. of inc. or dec.	Dec. 32.7	Inc. 73.8	Dec. 33.7	Dec. 0.7
Flour	1881. 131,202	45,792	16,310	9,932

San Francisco wheat exports in December were 2,578,525 bushels. For the six months of the California crop year, from July 1 to Dec. 31, the exports were, flour being reduced to wheat in the totals:

	1880.	1879.	Inc. or Dec.	P. c.
Flour, barrels	301,306	240,068	I. 61,238	25.5
Wheat, bushels	10,263,557	12,301,483	D. 2,037,926	16.6

Total, bushels

Nearly all the wheat went to Great Britain. Of the flour about one-third went to Great Britain, about one-third to China, one-sixth to Central America, and the rest was scattered to Japan, British Columbia and the Pacific islands.

In the six months 690,633 bushels of barley were sent from San Francisco by sea and 228,658 bushels by rail, a total of 919,291 bushels.

The Southwestern Passenger War.

Negotiations for peace having apparently failed, on Jan. 17, the Chicago & Alton adopted a new and even more warlike policy than heretofore. It announced large reductions in passenger fares from Kansas City to the chief points in Michigan and Canada, including Detroit, Grand Rapids, Ann Arbor, Flint, Saginaw, Guelph, Toronto and Montreal. The rates are from \$3 to \$6 less from Kansas City than they are from Chicago to the same points. They are on the basis of \$12.18 to Montreal. The Grand Trunk and Flint & Pere Marquette roads are said to have come into the arrangement. The Alton road also made heavy reductions on fares from Omaha to Toledo, Columbus, Indianapolis and other large cities in Indiana and Ohio.

A dispatch from Chicago, Jan. 18, however, says: "The cut in rates between points in the Southwest and Michigan and Canada, announced by the Chicago & Alton Railroad Company yesterday, was followed by telegraphic correspondence to-day between the managements of railroads interested in Southwestern traffic, which has resulted in a compromise which will probably end the long and bitter war in rates which has been carried on between Chicago, St. Louis and Kansas City. Beginning to-morrow, the Illinois Central, Chicago & Alton and Wabash roads will sell tickets from Chicago to St. Louis at \$8.70, with a rebate of \$4, and at the same rate from St. Louis to Kansas City. All the roads, including the Chicago, Burlington & Quincy and the Chicago & Rock Island, will sell tickets for Chicago to Kansas City direct at \$14.80, with a rebate of \$7.30. No round-trip tickets are to be sold at less than regular tariff rates."

"It is claimed that these rates will not admit of the sale by scalpers of the large number of outstanding unlimited tickets. The railway officials to-night are quite confident that the agreement to-day will establish permanent harmony between the roads, and express the opinion that the war is practically ended."

RAILROAD LAW.

Railroad Grade Crossings in Vermont.

The Legislature of Vermont at its recent session passed the following act regulating the movement of trains at the crossing of one railroad by another railroad:

Sec. 1. When a railroad is crossed by another railroad at grades, every engineer on either of the roads shall, before reaching the crossing, stop his engine at some point within 1,000 feet therefrom, shall sound the whistle before starting and pass slowly over the crossing; but one stop shall be sufficient for all such crossings within 1,000 feet of each other upon the same road.

Sec. 2. An engineer who violates the provisions of the preceding section shall be fined \$100, and the corporation on whose road the offense is committed shall be fined the further sum of \$800; and one-fourth part of each penalty collected shall go to the person making the complaint.

Vermont Railroad Legislation.

Among the laws passed by the Vermont Legislature at its recent session is one prohibiting companies or their employees from leaving hand-cars or other nuisances on the track or right of way at any crossing where horses might be frightened thereby. The penalty is from \$5 to \$20 fine, and liability of the company for any damages that may be caused.

Another act requires all passenger trains to be provided with brakes operated from the engine or by the engineer, before July 1, 1881, under penalty of \$50 fine for every train run without such brakes.

Another law requires all

THE SCRAP HEAP.

Locomotive Building.

The Rogers Locomotive Works, in Paterson, N. J., are building 10 locomotives to go to Spain, the first American locomotives ever sent to that country, we believe. They are for the Ferro-Carril de Vals a Villa Nueva y Barcelona; two of them are six-wheel connected engines for construction and yard purposes, and the rest ordinary eight-wheel or American engines, some for passenger and some for freight work.

The Dickson Manufacturing Co., at Scranton, Pa., is building 10 locomotives for the Erie, and 15 for the Delaware & Hudson Canal Co.

The Baldwin Locomotive Works, in Philadelphia, last week received an order for 144 narrow-gauge locomotives for the Denver & Rio Grande road.

The Grant Locomotive Works, in Paterson, N. J., have orders for a number of engines on hand.

Car Notes.

The Gilbert & Bush Co., in Troy, N. Y., has its shops full of work. Orders are on hand for four sleeping and two drawing-room cars for the Wagner Sleeping Car Company; 10 passenger cars for the St. Louis, Iron Mountain & Southern; several passenger cars for the Union Pacific; several passenger cars for the Chesapeake & Ohio, and a lot of open excursion cars for the new Saratoga Lake road. Besides these home orders one was lately received for 10 sleeping cars for a railroad in Brazil.

The Maine Central road has lately ordered six new passenger and 100 freight cars.

The Peninsular Car Co., of Detroit, now employs 200 men at its newly acquired shops in Adrian, Mich. The company has bought more land and will enlarge the works at once.

John L. Gill & Co., at Columbus, O., are building a large number of freight cars for the Toledo, Delphoo & Burlington road.

The Gilbert Car Works, at East Buffalo, N. Y., are building or have orders on hand for 250 refrigerator cars for the New York, Lake Erie & Western; 150 box cars for the New York City & Northern; 100 stock and 100 gondola cars for the Delaware & Hudson Canal Co.'s lines.

The Missouri Car & Foundry Co., in St. Louis, is building a sleeping and a boarding car for construction parties for the Gulf, Colorado & Santa Fe; 500 freight cars for the Chicago, St. Paul, Minneapolis & Omaha; 300 freight cars for the Union Pacific, and 200 box cars for the Illinois Central.

The Illinois Central Railroad shops are now building 300 box cars and 100 coal cars for the road.

The Lacomia Car Co., at Lacomia, N. H., is building 80 box and 100 flat cars for the Boston, Concord & Montreal; 35 long box cars for the Concord road, and a number of box cars for the Boston & Lowell.

Bridge Notes.

The Philadelphia Bridge Works of Cofrode & Saylor, at Pottstown, Pa., are running night and day, two sets of men being employed.

The Corrugated Metal Co., of East Berlin, Conn., is putting up an iron highway bridge over the Merrimack River at Manchester, N. H., the contract price of which is \$87,000. It is a double-deck four-truss bridge, 40 ft. wide, 1,100 ft. long, in four spans.

The Central Bridge Co., of New York, has the contract for the iron work of the new viaduct over the Illinois Central track at the foot of Randolph street in Chicago.

The Illinois Central has just completed a new wrought-iron Pratt truss bridge, 450 ft. long, over Salt Creek, about 3½ miles south of Clinton, Ill.

Iron and Manufacturing Notes.

The Indianapolis Rolling Mill last year turned out 22,327 tons of iron rails, the largest product ever made by this mill in one year.

Melby Furnace, in Middletown, Pa., has been bought by Haldeman & Ness, and will be repaired and put in blast as soon as possible.

The Gere Iron & Mining Co. is running its furnace at Port Leyden, N. Y., on an average 47 per cent. The furnace is 50 ft. high and 10 ft. bosh, and is making about 170 tons of iron a week, using 110 bushels of charcoal to the ton of pig-iron.

The Glencoe Iron Works, in Youngstown, O., are steadily increasing their manufacture of railroad track bolts.

The L. B. Flanders Machine Works, in Philadelphia, have lately shipped locomotive cylinder boring machines to the shops of the Wisconsin Central road and the Lehigh Valley road, and a valve-seat rotary planing machine to the Maine Central road.

A factory is to be started in Hamilton, Ont., to make railroad lanterns, head-lights and similar work.

The Phosphor-Bronze Smelting Co., limited, has removed its offices to No. 512 Arch street, Philadelphia. In connection with the new offices a sales and show room has been fitted up, where the various products of the company are on exhibition.

The Rail Market.

There has been a good deal of business in steel rails, both American and foreign. Prices are firm at about \$60 per ton at mill, with slight concessions on large orders.

Iron rails are active and slightly higher. Quotations are \$47 to \$53 per ton at mill, according to section of rails. A small sale of English rails at \$44.50 delivered at Galveston is reported, but nothing else below \$47.

Old iron rails are in active demand, but few sales are reported, holders generally asking more than buyers think it safe to pay. Sales are reported in New York at from \$27 to \$31, and in Philadelphia at \$27 to \$30 per ton.

Switch Rods.

A Hibernian switchtender, who saw a train coming in on time, said: "You are first at last, and you were always behind before."

"The Parlor Cattle Car Company" has been incorporated in Cincinnati, and "Boudoir hog cars" are expected next.—*Boston Post*.

An Ohio railroad company, in its report to the state Railroad Commissioner, explains the death of a boy by saying that he was tramping out a bumble-bee's nest on Sunday. The bees got after him and he ran under a train and was killed.—*Erie Railroad Journal*.

Just after the Erie express left Pittsburgh the other evening on the Pittsburgh & Lake Erie Railroad, a bogus conductor got a number of tickets from the passengers and escaped while the real conductor was in another car.

The Dixon (Ill.) *Telegraph* says: "Mr. Burke, one of the directors of the Chicago & Northwestern Railway, one of Governor Charters' old friends, sent Judge Charters and wife a New Year's present, an annual pass, for the year 1881, over all the lines of the Northwestern road, which now embrace 279,892 miles."

The Northwestern is a pretty big road, but it must have grown pretty fast to embrace more than three times as many miles of road as there were in this country a few weeks ago.

A Missing Railroad.

When Cheyenne was at the zenith of its glory, a sign of "General Offices of the Cheyenne, Pacific Slope & Sandwich Islands Railroad" was hung out one morning without creating the least surprise. If one person had asked another where the depot of the said railroad was, there might have been some hesitation about answering, but it was some time after the sign was out before any special inquiries began to be made. Then an Eastern man walked in one day, carpet-bag in hand, and said:

"I suppose you connect at San Francisco with the regular steamers?"

"Well, yes; I suppose we shall," was the hesitating reply.

"Shall? Isn't your road through yet?"

"Well, not quite."

"Do you take in Salt Lake?"

"Salt Lake? Yes. I think we do."

"How much for a ticket?"

"Well, I can't say exactly, as we have none on sale just yet."

"Can't I get one at the depot?"

"Well, I think not, we haven't any depot yet."

"Can I pay on the train?"

"Well, you see, we have no trains yet."

"I suppose I can walk on the track?" persisted the stranger.

"Well, I should have no objection if we had a track."

"No depot, no tickets, no trains, no tracks—what sort of a railroad have you got anyhow?"

"Well, you see, it's only on paper thus far, but as soon as we can sell \$8,000,000 worth of stock we shall begin grading and rush business right along. If you happen to be along when we get to going we will put you through as low as any other responsible route."

The stranger stuck his hands into his pockets, stared hard, whistled softly, and then walked out on tip-toe without another word.—*Wall Street News*.

Blast Furnaces of the United States.

The quarterly statement compiled by the *Iron Age* gives the condition of the blast furnaces of the United States on Jan. 1 as follows:

	In blast.	Out of blast.	Not reported.	Total.
Charcoal.....	160	112	3	275
Anthracite.....	162	76	..	238
Bituminous or coke.....	151	68	..	219
Total.....	473	256	3	732

The total weekly capacity of the 473 furnaces in blast is reported at 94,990 tons, an average of 201 tons each; that of the 256 furnaces out of blast is 40,723 tons, an average of 159 tons each. The total number of furnaces in and out of blast on the first of January, for the past seven years, has been:

	1875.	1876.	1877.	1878.	1879.	1880.	1881.
In blast.....	363	293	244	263	257	381	473
Out of blast.....	328	420	408	449	433	293	256

Though the whole number of furnaces in blast is so much greater than last year, there is a decrease in the number of anthracite furnaces in blast from 165 to 162. Last year 39 per cent. of the charcoal furnaces, 71 of the anthracite, and 61 of the bituminous furnaces were in blast; this year 59 per cent. of the charcoal, 68 of the anthracite, and 70 of the bituminous.

A Scientific Investigation in Frisco.

Some captious people now and then express considerable surprise that the Lick trustees are so slow about executing the behests of that well meaning, but somewhat eccentric old party. Such persons would understand the matter more thoroughly, however, if they could be favored with a profile view of said Board of Trustees slumbering peacefully at their weekly meeting, and listen to some of the reports read before said body by its secretary, who keeps awake himself under protest, and takes cat naps between his sentences. It will be remembered that among the minor bequests of the immense sum left by Mr. Lick was the appropriation of \$5,000, so to be expended in ascertaining whether there was any definite evidence of the common assertion made by navigators that the magnetic needle varied in a slight degree more east of north each year, what was the cause of this annual change and the best means of rectifying the same. The amount referred to was, therefore, placed some three years ago, in the hands of a relative of one of the trustees, named Cornelius B. Guffey, whose having just failed as a stock-broker was evidently considered by the board to give him exceptional facilities for the prosecution of this scientific work. Nothing was heard from Mr. Guffey as to the result of his mission until last Tuesday, when, after much somnific "punching up" by the secretary, he submitted the following brief, but exhaustive report:

Gentlemen: On receipt of the funds and instructions concerning same about which you have seen fit to bother me so constantly of late, I at once took active measures to obtain all the information possible on the subject in question, by sounding sundry seafaring men as to their views regarding the magnetic variation, or whatever you call it. This naturally involved the expenditure of considerable time around the wharves as well as large quantities of scientifically applied beer. Out of 710 alleged mariners interviewed on the subject, one said that he had frequently experienced great trouble in boxing the compass, and always thought there was something wrong about it. The remaining 709 said they didn't know. Not deeming this result satisfactory, I determined upon personal investigation. To this end I chartered the plunger Carrie Ann, placed on board a sufficiency of scientific materials, such as old Stag whiskey, bottled beer, sandwiches, fishing lines, bait, etc. I then started with a select party of compass sharps to Saucelito to fish for tomcods. The best way to catch tomcods is to bait with spile worms, and about two feet from the surface. Jimmy McGue caught a tommy 23 inches long, but as this is not strictly scientific information, the Trustees can cross it out if they like, or transfer it to their shirt cuffs for future reference. Coming back to the city, owing entirely, it is believed, to the eastward tendency of the compass or something, the boat ran on the rocks at Goat Island and scuttled the entire gang overboard. As this could not possibly have occurred without the magnetic needle shifting at least four inches in six hours, your honorable board can draw their own conclusions. A short time after this, a certain able seaman, whose views I had sought, introduced a retired whaler (though then in the business of promoting chicken and canine conflicts, who announced that during a voyage into the Arctic regions after furs, he had personally discovered the exact secret of the magnetic variation, which he was willing to impart for the trifling sum of \$2.50 and the beer. On mature deliberation I closed with these terms, and received from this intelligent person in one word the information for which the combined scientists of the world have been groping for 200 years, to my certain knowledge. It was BEARS. These huge and destructive animals, my informant stated, are in the habit of shoving around the small ice island upon which, he says, the North Pole is situated, just out of pure cussedness, and, of course, disarranging the compass in so

doing. This party, whose name is Philhooliban, or something like that, went on to state that the only way to put an end to this disgraceful practice, and prevent the eventual total destruction of commerce, was to devise some means of exterminating said bears at an early day. After mature reflection he had come to the conclusion, he said, that the only feasible manner of accomplishing this was to poison the critters off. Of course, as it was impracticable to reach those in the immediate vicinity of the Pole, on account of ice, he suggested that your honorable board fit out an expedition of war vessels to approach as near to said point as possible, and fire cannon loaded with the ordinary petrified Dutch bologna sausages of commerce in the direction of the seat of magnetic attraction. Said sausages to be first carefully impregnated with strychnine, or perhaps the ordinary canned vegetables used by our local boarding houses would be more deadly and effective, and nail more bears to the pound. The appropriation being exhausted, this concluded my researches, and I beg leave to submit the appended statement of expenditures for audit and approval:

Time spent in buzzing magnet sharps..... \$15.00

Boat hire..... 2.50

Lunch..... 5.50

Philhooliban's theory..... 2.50

Beer..... 4,970.00

Other liquors..... 4.45

One more beer..... 5

Total..... \$5,000.00

Perhaps with another appropriation of same amount (\$10,000 would be better) I could un-earh a few more facts.

Respectfully, CORNELIUS B. GUFFEY.

Now it hardly seems possible that in this day and age such a report as the above could be solemnly accepted and passed without comment by anybody, but such is the absurd fact. If proceedings of this nature are not enough to cause old man Lick to turn over in his coffin, then we don't correctly remember what kind of a hair-pin he was, that's all.—*San Francisco Evening Post*.

Fast Passenger Locomotive.

The Grand Trunk Railway, of Canada, has lately put on the division between Belleville and Toronto two locomotives with 6 ft. 3 in. driving wheels and 18 by 36 in. cylinders. This stroke is unusual; in fact the only case which we remember of so long a stroke of piston in a locomotive is that of some engines built by the Camden & Amboy some 20 years ago, which had 14 by 38 in. cylinders.

New Snow-Plow.

The Buffalo *Commercial Advertiser* thus describes a new device for clearing railroad tracks of snow:

"Mr. C. G. Cross, of Chicago, has invented a new snow-plow. It is arranged to be attached to the front end of an ordinary box-car, and is propelled by a portable engine placed inside of the car. The snow is received into a bonnet made of boiler iron, placed in front of the machine, and by a blast of hot air supplied by a fan is rapidly melted and run down into the water receptacle, and either allowed to flow out at the side, or thrown by a force pump from 50 to 100 ft. from the track. The machine is particularly adapted for deep cuts and in railroad yards, where usually the only method of cleaning the track in deep snow is by expensive manual labor. The first trial was only partially satisfactory, showing that the present form of construction will have to be changed somewhat."

A Long-Headed Brakeman.

The Erie (Pa.) *Dispatch* tells the following story, which our readers will believe, of course: "Brakeman Snodgrass, of Corry, met with an accident at that place while making a coupling that has probably never before been experienced by any man who lived to tell the tale. He had his head caught between the bumpers of two cars and was so horribly squeezed it was not deemed possible he could live, but he is now getting along finely. His head, which was once round, was pressed by the accident out long and slim. He is also from one-half to three-quarters of an inch taller than formerly. The terrible squeeze which his head received has made him cross-eyed, but, strange as it may seem, his mind is as clear and bright as it ever was."

The Amenities of Debate.

We have had occasion once or twice this session to allude to the loving and gentle terms by which the "nobility" of Canada allude to each other in the Dominion Parliament. A while ago in a Hochelaga speech Sir John Macdonald, Premier, got pathetic and said in a few years, after he was dead, he hoped he would look down on the completed Canada Pacific Railroad. It is generally supposed that angels have better business on hand than gazing at canoes with a mad conductor swearing at a slow brakeman, and so a ripple of ridicule went over Canada at Sir John's celestial allusion. In speaking about the railroad terms on Thursday in Parliament Sir Albert Smith said Sir John would be looking up instead of down. Another noble member said, "Where will you be?" Before Sir Albert could give any information regarding his ultimate destination, a third Knight answered, "He'll be melted." Thus do the titled aristocracy of the neighboring empire arrange the terms on which a railroad is to be built.—*Detroit Free Press*.

Working Both Ways.

Charles Merritt is a Galveston merchant, who deals in such perishable merchandise as apples, potatoes and the like, which he imports by rail. Yesterday the railroad office telephoned him: "If you don't remove that car of freight which arrived yesterday we will charge you demurrage."

Merritt bawled back: "I say! how much demurrage are you going to charge me on that other car-load of potatoes that ought to have been here a week ago, but has not got here yet?"

There was a silence in that railroad office that would have done credit to the private graveyard of a deaf and dumb asylum.—*Galveston News*.

OLD AND NEW ROADS.

Alpena & Bay City.—Meetings are being held to advocate the building of a railroad from Alpena, Mich., on Thunder Bay, southward through Alpena, Harrisville, Au Sable and Tawas, following nearly the shore of Lake Huron, to Bay City. The distance is about 120 miles, but some 30 miles of road could be saved by making connection with the Jackson, Lansing & Saginaw road.

Atchison, Topeka & Santa Fe.—Notice has been given that the time for closing the subscriptions under circular No. 54 has been extended to Feb. 21, 1881, at close of business, in order that there may be time for adjustment of rights. All subscriptions under the circular must be made as stockholders of record Feb. 1, 1881, as stated in the circular. Rights to take stock at par under the circular have been selling in Boston at \$8 per share.

Atlanta & Alabama.—The incorporators of this company have completed their organization and ordered books opened for subscription. Further proceedings will probably depend upon what response is made to the call for subscriptions. The road is to run from Atlanta, Ga., westward into

the rail, and experience certainly indicates that the when preserved have gained immensely in life in Europe. Whether a like result would be attained by using preserved ties with rails laid as they are in this country has never been fully demonstrated. Experience indicates, though, that the capacity of ties to resist abrasion, as well as decay, is very much increased if the preservative process employed is a good one and the ties are thoroughly treated. The question is so important, however, that the truth of the often made, but perhaps erroneous, statement, that "ties cut out before they rot," should be ascertained beyond doubt. Timber is also largely used on railroads in places where there is very little wear, but it is only subject to destruction from decay. Here certainly is a hopeful field for experiment.

But, however the views of engineers may differ as to the efficacy of the different methods in preserving wood from decay, there seems to be very little doubt in the minds of those conversant with the subject that creosoted timber will not be attacked by the teredo. This fact is important to most railroads approaching the seaboard. The teredo is more or less active along the whole seacoast, except at the mouths of large fresh-water rivers, and is especially destructive in Southern waters.

The wood-cut herewith represents two sections of a spruce pile, one creosoted at the Hayford Creosoting Works, at Elizabethport, N. J., and the other a piece of the same pile in its natural state. The two pieces are fastened together by cleats of creosoted hemlock, and further protected by a chain. The block on the left shows a cross-section of the creosoted block. These blocks were exposed in the sea at the mouth of Cape Fear River during one year.

This illustration has a twofold interest. The unprepared block on the left, which originally filled all the space between the cleats, and is now more like a sponge than wood, riddled through and through by the teredo, shows how terribly destructive the teredo is in Southern waters. And the creosoted block, the cross-section of which shows that not a single bore has been pierced in it, is conclusive evidence of the value of the process. It may be stated, in answer to the objection that this has been tested but a single year, that creosoted piles have been used in Europe for 30 to 40 years, and many are still doing service in teredo-infested waters which were driven so long ago, and are still as sound as at first. This is to be expected, since the creosote oil is insoluble in water, so time has no effect upon piles treated with it. In creosoted piles, exposed in the Gulf of Mexico during seven years, when cut the oil seemed to be in a limpid state, and the odor from it as pungent as at first.

During a few years past, many thousand creosoted piles have been driven in the sea in various parts of this country whose record, as far as we have been able to learn, has been entirely satisfactory. When the New Orleans & Mobile Railroad was first built several miles of bridges and trestles were constructed of untreated pine piles. It is said that many of these were riddled by the teredo and broke off before the rails were laid over them. The importance of protecting them in some way was apparent, so the company erected works for creosoting and has renewed all the bridges and trestles with creosoted pine, thoroughly treated, which is doing excellent service and has not been touched by the teredo at all. The new ferry house at Hoboken, N. J., was erected the past summer on 1,000 creosoted piles. At that point untreated piles were cut off by the teredo in from 6 to 10 years. Other creosoted piles have been used in government work, in Charleston, S. C., and in New Jersey.

It is said that no substance for injection into wood has yet been discovered which will protect it from the teredo except creosote oil. Various substances have been tried, including poisonous salts, which have been proved valuable in preserving wood from decay, but the teredo does not seem to avoid them. Many years ago a commission was appointed in Holland, which made a careful study of the subject and experimented with every suggested method, but, it is reported, found nothing would answer except creosote, which was adopted for all government work, and is used with entire success. In England, also, and in France and Belgium, it is said that no wood has been used during the past 30 years in marine construction which had not been previously injected with 10 lbs. of creosote oil per cubic foot.

Creosoting timber is costly, perhaps, at the outset, but a real economy in the end. In marine work the labor is generally an important factor in the cost, so that even where lumber is abundant, as in the South, it is wasteful and costly not to take the precaution to make the timber last longer than the three or four years which is usually the total life in Southern waters without protection. Mechanical means are sometimes adopted, such as sheathing with sheathing metal or copper, but these are only temporary and a great temptation to river thieves. Sheathing is a protection so long as it remains intact, but with the slightest break in the metal its usefulness is gone. Moreover, the

cost is greater than that of creosoting. Covering the surface with copper and, perhaps, iron nails also, is a protection, but they must have broad heads and be driven so closely as not to leave any portion of the surface exposed. But this plan is usually more expensive than creosoting.

Wool Traffic from the Pacific Coast.

The largest single item of freight eastward over the Pacific railroads is wool, exceeding in tonnage tea and wine. The product of the state in 1880 is reported to have been 46,074,200 lbs., of which 44,563,800 lbs. were received at San Francisco, and the balance shipped direct to the East. Besides this San Francisco received 7,022,500 lbs. from Oregon, and 275,000 from foreign sources. It appears thus that substantially the whole wool traffic of the Pacific railroads originates on the Pacific coast, and none of the large Australian production seeks a market by this route. As the traffic is chiefly concentrated at San Francisco, probably a new railroad to that city would command a full share of the traffic, if the relation between through and local rates should be maintained; but as the Central Pacific owns nearly the whole railroad system of California, it probably would, if it had a rival at San Francisco, make the rates from its local points to the

the paper on the same general subject which he read some two years ago, and which has attracted a great deal of attention here and abroad. The programme of the meeting is not yet completed, but it will include visits to the Midvale Steel Works, the Penney Iron Works, etc., and receptions at the Academy of Fine Arts and at the Penn Club.

NEW PUBLICATIONS.

The Mechanical Engineer.—The first numbers of this "illustrated weekly devoted to applied mechanics and the arts," which is published by Egbert C. Watson & Son, No. 5 Beekman street, New York, has been received. It has eight pages, 10½ x 14 in., well printed and copiously illustrated. The elder Mr. Watson is an experienced mechanical engineer, and was formerly editor of the *Scientific American*, and, therefore, brings experience with him in his new venture. There is certainly a field for a paper of this kind in this country, but to succeed it must occupy ground somewhat different from that which is cultivated by old established publications.

The publishers announce it as their intention to make a thoroughly "practical, common-sense, orthodox mechanical paper," and say that "it is not an advertising sheet," although they admit that they "are obliged to take some advertisements, in order to keep up steam." It may be inferred, then—to use an engineering simile—that it is not a full-stroke advertising sheet, but that that department is worked with a cut-off. With the hope that the proprietors will succeed in getting a high "duty" out of their new venture, and commending it to the consideration of all mechanical engineers, we will leave them to judge whether it is "orthodox" or not.

Governor's Messages on Railroads.

The Governor of Illinois, who has just begun his second term, says:

"The annual report of the Railroad and Warehouse Commissioners will be found to contain a comprehensive statement of the condition and operations of the railroads in this state more than ever before. This vast interest, whose annual gross earnings are nearly \$50,000,000, and which employs over thirty-two thousand persons in our state, and in which every citizen is interested, either as taxpayer, stockholder or patron, which enters into and concerns every business interest, necessarily demands the careful study and attention of the law-maker.

"The past year has been an unusually prosperous one for railroads. Their business has been immensely enlarged and their earnings increased. Very many have come out of a condition of insolvency or serious financial embarrassment, and have been reorganized under hopeful auspices. The present favorable condition of these corporations is the result of great business activity and general prosperity.

"The power of the state to enforce proper regulations upon common carriers to prevent extortion and unjust discrimination, and provide for public safety, is now established and admitted. It has been recognized and affirmed by the highest courts in the land. In the exercise of this power, in the light of the experience of older communities as well as our own, the necessity of a tribunal like the Railroad and Warehouse Commission is now generally recognized. Through their agency the relations between the public and the railways are becoming better understood, and many evils have been reformed. I hope that, under the influence of public opinion, enlightened by the investigations of the Commissioners and directed by the decisions of the courts, the railroads will adopt such a policy as will make their relations with the public entirely harmonious."

The Governor of Tennessee recommends the establishment of a Railroad Commission for that state, "charged with the assessment of the railroads of the state and investigation of their freight and passenger rates, and clothed with such powers as may be necessary to enable it to enforce justice and equality and the regulation of their freight and passenger rates."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

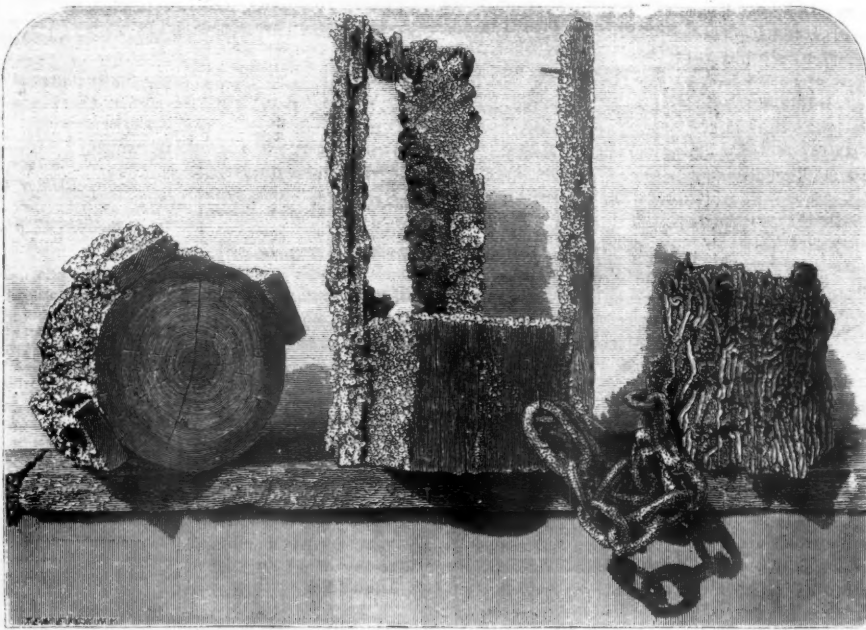
Meetings will be held as follows:
Indianapolis & St. Louis, annual meeting, at the office in Indianapolis, Feb. 16.
Indiana, Bloomington & Western, special meeting, in Indianapolis, March 15.
The *Philadelphia & Reading* meeting is now called for March 7, but the time may be changed by the Court.

Dividends.

Dividends have been declared as follows:
Oregon Railway & Navigation Company, 2 per cent., quarterly, payable Feb. 1.
Panama, 5 per cent., quarterly, payable Feb. 1. This company increases from 4 to 5 per cent.
Illinois Central, 3½ per cent., semi-annual, payable March 1. This company increases from 3 to 3½ per cent.

Foreclosure Sales.

The *Atlantic, Gulf & West India Transit* road will be sold in Fernandina, Fla., Feb. 7, under a decree of the United States Circuit Court. It is understood that an agreement has been made among the creditors of all classes, and that the road will be bought in by the present owners. The road, originally the Florida Railroad, extends from Fernandina to Cedar Keys, 154 miles. The present company has refused to make any statements whatever of its operations.



East and to San Francisco such that there would be an advantage in shipping directly to the East, in which case the Central Pacific would get the long haul, rather than to San Francisco, where the Central Pacific would have to compete with another road for the shipment to the East.

About 18 per cent. (8,511 tons) of Pacific coast production arrived from Oregon and Washington, and this portion, and this only, the Northern Pacific will be in better position to command than the Central or Southern Pacific—a little more than a car-load a day.

Wool is the only important agricultural product of the Pacific coast that reaches the Eastern or European market by rail—nearly all the wheat and most of the wine goes by sea around Cape Horn. Of 51,671,700 lbs. of wool marketed in 1880, 9,055,400 were consumed in California, and of the 42,616,300 lbs. that were shipped, 71 per cent. went by rail, amounting to 15,196 tons, or about five car-loads daily. This, it must be remembered, is usually the largest single item of east-bound freight over the Central Pacific. In some years, however, barley shipments of greater weight have been made. Barley and not wheat is carried, because the market for barley is in the West, and it does not have to be carried more than two-thirds of the way across the continent, while the market for California wheat is exclusively in Europe; and it is delivered there from San Francisco by vessels around Cape Horn at much less than a rail rate from San Francisco to New York based even upon the low trunk line rates from Chicago to New York. The latter last summer would have amounted to about 74 cents per bushel from San Francisco to New York. The vessels carry from San Francisco to Liverpool at rates varying from about 25 to 38 cents.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:
Texas & St. Louis.—Extended from Trinity River, Tex., west by south to Corsicana, 25 miles. Gauge, 3 ft.
This is the first new track reported for 1881.

THE AMERICAN INSTITUTE OF MINING ENGINEERS will hold its next annual meeting in Philadelphia, beginning Tuesday evening, Feb. 15. One of the chief subjects of discussion at this meeting will be steel rails. Mr. Sandberg's paper on "Rail Specification and Rail Inspection in Europe," which was read at the Lake Superior meeting, will come up for discussion, and Dr. C. B. Dudley, will present a paper on the "Wear of Steel Rails in relation to their Chemical Composition and Physical Properties," which will supplement

ELECTIONS AND APPOINTMENTS.

Alabama Great Southern.—The following appointments are announced on this road: Cabell Breckenridge, Engineer in charge of road-bed, bridges and structures; H. Y. Hall, Road-Master; M. J. Meehan, Master Mechanic in charge of motive power, machinery and cars.

Atlanta & Alabama.—This company has been organized by the election of the following directors: John Collier, B. E. Crane, J. F. Cummings, J. W. English, E. P. Howell, S. M. Inman, R. C. Mitchell, Anthony Murphy, R. D. Spaulding. The board elected Anthony Murphy President; J. F. Cummings, Vice-President; W. T. Newman, Attorney; H. Castleman, Secretary. Office in Atlanta, Georgia.

Bachman Valley.—At the annual meeting in Hanover, Pa., Jan. 10, the following officers were chosen: President, A. W. Eichelberger; directors, Joseph Althoff, Joseph Delone, Levi Dubs, J. W. Gitt, E. W. Heindel, C. L. Johnson, Stephen Keefe, Adam Newcomer, Percy Pine, Henry C. Schirner, Edwin Thomas, Samuel Thomas. The road is worked by the Hanover Junction, Hanover & Gettysburg Company.

Baltimore & Cumberland Valley.—At the annual meeting in Chambersburg, Pa., Jan. 10, the following directors were chosen: David Wills, J. M. Hood, A. Rieman, D. J. Foley, C. W. Humrichouse, W. L. Chambers, J. P. Culbertson, George B. Cole, John W. McPherson. The road is controlled by the Western Maryland Company.

Berlin Branch.—At the annual meeting in Abbottstown, Pa., Jan. 10, the following officers were chosen: President, A. W. Eichelberger; directors, Wm. Bittinger, G. W. Diehl, Stephen Keefe, W. S. Hildebrand, Samuel Meissenhelter, Jacob Resser, A. W. Storm, Robert M. Wirt, Joseph Wolf; Secretary, A. W. Storm; Treasurer, Jacob Resser. The road is leased to the Hanover Junction, Hanover & Gettysburg Company.

Bradford, Kinzua & Smethport.—At the annual meeting, Jan. 11, the following directors were chosen: W. W. Brown, J. W. Humphrey, Bradford, Pa.; Henry Hamlin, Smethport, Pa.; John J. Carter, H. F. Sweetzer, Titusville, Pa.; W. S. Bissell, R. G. Taylor, B. C. Williams, Buffalo, N. Y.; R. C. Vilas, New York. The board elected W. W. Brown, President; R. G. Taylor, Vice-President; B. C. Williams, Secretary and Treasurer.

Buffalo, Bradford & Kinzua.—At the annual meeting, Jan. 11, the following directors were chosen: W. W. Brown, John A. Read, Bradford, Pa.; John J. Carter, B. N. Hurd, H. F. Sweetzer, Titusville, Pa.; R. G. Person, East Aurora, N. Y.; W. S. Bissell, R. G. Taylor, B. C. Williams, Buffalo, N. Y.; R. C. Vilas, New York. The board elected John J. Carter, President; R. G. Taylor, Vice-President; B. C. Williams, Secretary and Treasurer.

Champlain Transportation Co.—At the annual meeting last week the following directors were chosen: Le G. B. Cannon, I. V. Baker, V. F. Noyes, Geo. B. Chase, Z. V. K. Willson, A. L. Inman, Russell S. Taft. The board elected Le Grand B. Cannon, President; I. V. Baker, Vice-President; P. W. Barney, Clerk and General Superintendent; V. F. Noyes, Treasurer; E. Root, Chief Engineer.

Chicago, Milwaukee & St. Paul.—Mr. F. C. Butterfield has been appointed Master Mechanic of the Iowa & Dakota Division. He was formerly on the St. Paul & Sioux City road.

Cleveland, Columbus, Cincinnati & Indianapolis.—The following notices have been issued by General Road-Master G. M. Beach:

"W. C. Irwin has this day been appointed Engineer of Bridges of this road. Mr. Irwin will have charge of and be responsible for the condition of all bridges, culverts, trestle-work and structures of like character, and will at once enter upon the discharge of said duties, with head-quarters at Cleveland."

"M. Bowen has been appointed Road-Master of Division A, from Cleveland to Columbus, to take effect Jan. 11, 1881, vice W. C. Irwin, appointed Engineer of Bridges."

Dayton & Southeastern.—At the annual meeting in Dayton, O., Jan. 11, the following directors were chosen: E. E. Mead, John K. McIntire, W. P. Callahan, T. A. Legler, J. D. McKee, M. C. Allison, F. C. Trebein, A. J. Christopher, John L. Persinger, Daniel McLean, Wm. J. Ingham, John C. Enteklin, H. S. Willard, Wm. Clarke, S. F. Secrist. The new directors are J. D. McKee, S. F. Secrist and William Crane, chosen in the place of Messrs. Robert I. Cummin, George C. Rittenour and H. F. Austin.

Delaware.—At the annual meeting in Dover, Del., Jan. 18, the following directors were chosen: S. M. Felton, Isaac Hinckley, A. C. Gray, Charles Warner, Christian Feigler, Edward Brighurst, Jr., Isaac Jump, H. B. Fiddeman, Manlove Hayes, Alexander Johnson, James J. Ross, Albert Curry, J. Turpin Moore. The board re-elected Samuel M. Felton, President; Manlove Hayes, Secretary and Treasurer. The road is leased to the Philadelphia, Wilmington & Baltimore Company.

Delaware River & Lancaster.—At the annual meeting in Lancaster, Pa., Jan. 10, the following were chosen: President, Robert Crane; Directors, Christian S. Kauffman, D. Brainard Case, Dr. John K. Linesweaver, Dr. Henry Carpenter, N. H. Anders, Dr. Robert M. Bolenius, John D. Skiles, John S. Roland, Isaac A. Guldin, Alexander Sellers, E. D. White, Samuel K. Cassel; Secretary, D. Brainard Case; Treasurer, Dr. Henry Carpenter.

Engineers' Club, of Philadelphia.—The following standing committees have been appointed for the year 1881: Finance, F. Graff, J. J. de Kinder. Membership, J. J. de Kinder, George Burnham, Jr. Publication, Rudolph Hering, George Burnham, Jr. Library, T. M. Cleemann, F. Graff.

Evansville, Dayton & Eastern.—The directors of this new company are: H. S. Bennett, Wm. E. Bird, Lewis Foltz, S. P. Gillett, J. A. Lemcke, Evansville, Ind.; Wm. Archer, Charles H. Clark, J. L. Davis, G. W. Sturgis, New York. The board has elected Wm. E. Bird President; Lewis Foltz, Secretary and Treasurer.

Fitchburg.—The following circular is dated Boston, Jan. 10: "Mr. J. E. Tucker is appointed General Freight Agent, vice Mr. C. L. Hartwell, transferred to other duties. Mr. C. L. Hartwell is appointed Freight Auditor, vice Mr. C. A. Wetton, resigned. Offices in passenger depot of the company, Boston, Mass. Appointments take effect Feb. 1, 1881."

Hannibal & Southwestern.—The directors of this new company are: J. T. Barber, A. T. Davis, D. M. Delany, Wm. M. Ely, J. H. Garth, J. R. Hall, J. T. Hawkins, J. T. K. Hayward, J. M. Jursket, W. H. Loomis, C. Voorhees, R. S. Withite. Office in Hannibal, Mo.

Illinois Railroad Commission.—The Governor of Illinois has nominated as Railroad and Warehouse Commissioners, William M. Smith, of McLean County, and George M. Bogus, of Cook County, to be their own successors, and Wm.

H. Robinson, of Wayne County, as successor of John H. Oberly, whose term has expired.

Kansas, Arizona & Pacific.—The directors of this new company are: S. T. Emerson, Alfred Ennis, Charles M. Hays, James A. Hill, W. A. Johnston, Thomas J. Porter, Wm. Spriggs, A. A. Talmage, Charles G. Warner. A majority of them are connected with the Missouri Pacific.

Kansas City Union Depot Co.—The following officers were chosen last week: President, George H. Nettleton; Secretary, W. J. Farrey; Treasurer, C. C. Ripley; Superintendent, H. Hale; Executive Committee, G. H. Nettleton, S. F. Smith, A. A. Talmage.

Lehigh Valley.—At the annual meeting in Philadelphia, Jan. 18, the following were chosen: President, Charles Hartshorne; Directors, James I. Blakslee, Wm. L. Conyngham, Wm. A. Ingham, George B. Markle, Harry E. Packer, Robert A. Packer, Ario Pardee, Joseph Patterson, Robert H. Sayre, David Thomas, Ashbel Welch, Elisha P. Wilbur. There is no change from last year.

Louisville, Cincinnati & Lexington.—The following circular, from General Superintendent Mahl, is dated Louisville, Ky., Jan. 6:

"George C. McMichael has this day been appointed Assistant Road-Master. He will have the direct supervision of the track and road-bed of the lines operated by this company. His orders will be respected accordingly."

Marion & Indianapolis.—The directors of this new company are: Eli Jordan, James F. McDowell, James Brownlee, Elijah Kitch, William Garner, Pierce Norton, Marshall T. Tingley, Jonathan W. Parsons, John Brownlee.

Midland North Carolina.—At a meeting held in Newberne, N. C., last week the following directors were chosen: Lewis Coleman, Laban Pratt, Frederick Davis, Wm. S. Denny, Boston; Henry S. Ferbel, Wm. J. Best, Robert W. Ferguson, A. V. Stout, John W. Little, New York; Richard H. Taylor, Washington; J. M. Worth, John S. Henderson, Jas. A. Bryan, John Manning, W. B. Duncan, A. Oaksmith, North Carolina. The board elected Wm. J. Best, President; Lewis Coleman, Vice-President; Wm. S. Denny, Treasurer.

Missouri & Arkansas.—At the annual meeting last week the following directors were elected: Powell Clayton, L. M. Lloyd, J. T. McElheny, W. H. Stein, James Torrens. The new board organized by electing Powell Clayton, President; J. T. McElheny, Secretary; W. H. Stein, Treasurer.

Missouri, Arkansas & Southern.—At a recent meeting the following officers were chosen: President, C. W. Rogers, St. Louis; Vice-President, John O'Day, Springfield, Mo.; Secretary and Treasurer, T. W. Little, Fayetteville, Ark. Mr. Rogers is General Manager of the St. Louis & San Francisco road.

New Haven & Northampton.—The board has re-elected Charles N. Yeamans, President and Superintendent; George St. John Sheffield, Vice-President; Edward A. Ray, Secretary and Treasurer.

New York City & Northern.—At the annual meeting in New York, Jan. 13, the following directors were chosen: C. F. Woerishoffer, Henry Villard, E. P. Fabbri, A. Lichtenstein, A. Hegewisch, R. M. Gallaway, G. P. Lowrey, J. F. DeNavarro, Lewis Roberts, Lewis May, Joseph S. Stout, Wm. Endicott, Jr., Horace White.

New York Elevated.—The new board has re-elected Cyrus W. Field, President; John D. Mairs, Vice-President; James A. Cowing, Secretary and Treasurer; Thomas Gerehart, Assistant Secretary and Treasurer.

New York, Ontario & Western.—At the annual meeting in New York, Jan. 19, the following directors were chosen: Wm. Adams, Jr., Henry Amy, Fred. Butterfield, Charles J. Canda, E. E. Chase, Thomas C. Clarke, Wm. H. Fenner, Theodore J. Houston, Conrad N. Jordan, Horace H. Porter, Jacob H. Schiff, E. F. Winslow, C. J. Woerishoffer. The board elected Gen. E. F. Winslow President.

Norwich & Worcester.—At the annual meeting, Jan. 12, the following directors were chosen: Francis H. Dewey, George W. Gill, Charles W. Smith, Edward L. Davis, Worcester, Mass.; John F. Slater, Norwich, Conn.; Wm. F. Weld, Boston; W. Bayard Cutting, New York. The board re-elected Francis H. Dewey, President; Edward T. Clapp, Clerk; George L. Perkins, Treasurer; P. St. M. Andrews, Managing Agent under the lease. The road is leased to the New York & New England Company.

Ohio & Baltimore Short Line.—At the annual meeting, Jan. 10, the following were chosen: President, J. B. Washington, Pittsburgh; directors, W. W. Smith, Wm. Workman, Dr. Thomas McKennan, Henry M. Dougan, Washington, Pa.; Wm. Keyser, T. Harrison Garrett, John K. Cowen, Baltimore. The board re-elected W. W. Smith, Secretary; W. H. Tjams, Treasurer; W. T. Thelin, Auditor; James L. Randolph, Chief Engineer. The company is controlled by the Baltimore & Ohio.

Ohio Central.—The following officers have been chosen: President, D. P. Eslls, Cleveland, O.; Vice-President, Samuel Thomas, Toledo, O.; Secretary and Treasurer, B. G. Mitchell, New York.

Peachbottom.—At the annual meeting in York, Pa., Jan. 10, the following were elected: President, Charles R. McConkey; Directors, W. Latimer Small, Michael Schall, William Wallace, A. C. Manifold, William G. Ross, John Humphrey, Samuel Dickey, John A. Alexander, Robert B. Patterson, J. Penrose Ambler, Charles H. Stubbs, Isaac Bradley.

Pennsylvania Company.—At a meeting of the board of directors of this company, held Jan. 11, the following officers were elected: S. B. Liggett, Secretary, in place of Clifford Stanley Sims, resigned, and Stephen W. White, Assistant Secretary, in place of S. B. Liggett, appointed Secretary; both appointments to take effect Feb. 1.

The Secretary's office will be at the general office of the company, Pittsburgh; that of the Assistant Secretary at No. 233 South Fourth street, Philadelphia.

Pennsylvania Leased Lines.—At the annual meetings last week officers were chosen as below by the following companies, whose roads are leased to the Pennsylvania Railroad Company: **Bald Eagle Valley.**—President, L. A. Mackey; directors, Thomas A. Scott, Andrew G. Curtin, John Irwin, Sr., James Gamble, C. A. Mayer, George B. Roberts, John P. Green, James Duffy, Strickland Kneass, J. N. DuBarry; Secretary and Treasurer, Edmund Blanchard. **Tyrone & Clearfield.**—President, J. N. DuBarry; directors, John P. Green, Strickland Kneass, Wistar Morris, J. B. Roberts, N. P. Shortridge, Edmund Smith. **Moshannon & Clearfield.**—President, J. N. DuBarry; directors, John P. Green, Strickland Kneass, Wistar Morris, G. B. Roberts, N. P. Shortridge, Edmund Smith. **Susquehanna & Clearfield.**—President, J. N. DuBarry; directors, John P. Green, Strickland Kneass, Wistar Morris, G. B. Roberts, N. P. Shortridge, Edmund Smith. **Riverfront.**—President, Strickland Kneass; directors, George B. Roberts, J. N. DuBarry, Wistar Morris, S. M. Felton, Josiah Bacon, N. P. Shortridge, Ed-

mund Smith, A. J. Cassatt; Secretary and Treasurer, James R. McClure. **Germanstown & Chestnut Hill.**—President, G. B. Roberts; directors, Josiah Bacon, A. J. Cassatt, G. Morris Dorrance, John P. Green, Strickland Kneass, N. P. Shortridge. **Philadelphia & Merion.**—President, G. B. Roberts; directors, Josiah Bacon, R. D. Barclay, J. N. DuBarry, John P. Green, Strickland Kneass, Joseph Lesley, Wistar Morris, Henry M. Phillips, Thomas A. Scott, N. P. Shortridge, Edmund Smith, Wm. M. Spackman.

Pittsburgh, Cincinnati & St. Louis.—At a meeting of the board of directors of this company, held Jan. 11, the following officers were elected: S. B. Liggett, Secretary, in place of Clifford Stanley Sims, resigned, and Stephen W. White, Assistant Secretary, in place of S. B. Liggett, appointed Secretary; both appointments to take effect Feb. 1.

The Secretary's office will be at the general office of the company, Pittsburgh; that of the Assistant Secretary at No. 233 South Fourth street, Philadelphia.

Portland & Ogdensburg.—At the annual meeting in Portland, Me., this week, the following directors were chosen: Samuel J. Anderson, J. P. Baxter, J. Eastman, Francis Fessenden, H. N. Jose, W. F. Milliken, R. M. Richardson, J. S. Ricker, W. W. Thomas, Jr., Samuel Waterhouse.

Rutland & Whitehall.—This company has elected W. W. Cook, President; I. V. Baker, Vice-President; Charles H. Allen, Clerk; Ira C. Allen, Treasurer. The road is leased to the Delaware & Hudson Canal Company.

St. Louis & San Francisco.—Mr. T. B. Caldwell has been appointed Southern Passenger Agent, with head-quarters in Nashville, Tenn. He was recently on the Indianapolis & St. Louis.

Springfield, Effingham & Southeastern.—At the annual meeting recently the following directors were chosen: D. M. Billings, W. P. Black, E. Pratt Buell, J. J. Funkhouser, J. B. Lyon, D. W. Odell, G. N. Parker, Thomas B. Rice, Wm. Scurgis.

Toledo, Delphos & Burlington.—Mr. N. S. Hotchkiss, Foreman of Bridges and Buildings, is appointed also Road-Master, with office at Delphos, O., in place of E. R. Campbell, resigned.

Utica, Clinton & Binghamton.—At the annual meeting in Utica, N. Y., Jan. 18, the following directors were chosen: R. S. Williams, Isaac Maynard, George B. Phelps, F. D. Beebe, W. M. Storrs, John Thorn, W. S. Bartlett, Henry Hopson, A. W. Reynolds, James I. Scollard, J. W. Lippitt, D. W. Ingalls, Allen Curtis. The road is worked by the Delaware, Lackawanna & Western.

Vermont Railroad Tax Assessors.—Governor Farnham, of Vermont, has appointed S. M. Gleason, of Thetfield, Albert Dwinell, of Calais, and Mason S. Colburn, of Manchester, as the State Board to appraise railroad property for taxation under the law of last year.

Virginia Midland.—The officers of this company, successor to the Washington City, Virginia Midland & Great South-ern, are as follows: John S. Barbour, President; L. W. Reid, Secretary; W. H. Marbury, Treasurer; Peyton Randolph, General Superintendent.

Western Railroad Association.—At the annual meeting in Chicago, Jan. 11, the following directors were chosen: B. F. Ayer, Illinois Central; B. C. Cook, Chicago & Northwestern; A. L. Osborn, Michigan Central; T. J. Potter, Chicago, Burlington & Quincy; T. F. Withrow, Chicago, Rock Island & Pacific; T. B. Blackstone, Chicago & Alton; Charles Paine, Lake Shore & Michigan Southern; C. W. Rogers, St. Louis & San Francisco; S. S. Merrill, Chicago, Milwaukee & St. Paul; F. de Funiak, Louisville & Nashville; G. H. Nettleton, Kansas City, Ft. Scott & Gulf; J. C. Clarke, Chicago, St. Louis & New Orleans. The board elected officers as follows: President, B. F. Ayer; Secretary and Treasurer, J. H. Raymond; General Counsel, George Payson; Executive Committee, B. F. Ayer, B. C. Cook, A. L. Osborn, T. F. Withrow, T. B. Blackstone.

Wisconsin Peninsula.—The directors of this new company are: H. Ellis, Wm. Hoffman, D. M. Kelly, Timothy O. Howe, S. M. Marshall, George Richardson, M. P. Skeltz, Henry Strong. Office at Green Bay, Wisconsin.

PERSONAL.

—Baron von Weber, who visited the United States last summer to study our river improvements and narrow-gauge railroads and report to the Prussian Ministry of Public Works, on his return was named Privy Councillor by the Emperor.

—Mr. D. B. Robinson, formerly on the Central Vermont, and for some years past Superintendent of the New Orleans & Mobile road, now the New Orleans Division of the Louisville & Nashville, lately resigned that position to accept the charge of the Sonora Railroad in Mexico, now under construction.

—Mr. Oliver Byrne, C. E., died in Maidstone, England, Dec. 9, aged 70 years. He had been in failing health some time. Mr. Byrne was the author of several engineering works, and notably editor of, and a large contributor to, *Spon's Dictionary of Engineering*, and the first edition of *Appleton's Dictionary of Mechanics*.

—It is reported in Boston that Mr. W. T. Hart has tendered his resignation as President of the New York & New England Company, in consequence of opposition from the New York element in the board. The report has been denied, but not officially. The board has taken no action on the resignation, if really offered, and Mr. Hart still retains the office.

—Hon. Thomas C. Platt, who will succeed Hon. Francis Kernan as Senator from New York, is General Manager, Secretary and a Director of the United States Express Company, and President of the Southern Central Railroad Company. One of his chief competitors in the Republican caucus was Hon. Chauncey M. Depew, General Counsel of the New York Central & Hudson River Company.

—Col. Charles P. Ball has resigned his position as General Superintendent of the Alabama Great Southern Railroad. He went to the road five years ago, having been previously on the Western Railroad of Alabama, and under his charge it has been practically rebuilt and placed in as good condition as any line in its neighborhood. When he took charge it was unsafe even for the limited business then done.

—Gen. W. J. Sewell, just nominated for United States Senator by the New Jersey Republicans, and who will in all probability be duly elected to that position next week, has for many years been Superintendent of the West Jersey Railroad and was lately promoted to be Vice-President of the company. He has served several years in the New Jersey Legislature, first in the Assembly and afterward in the Senate, and was twice President of the Senate.

—Mr. Fred. P. Mosely, Purchasing Agent of the Old Colony Railroad and the Old Colony Steamship companies, died

in Boston (Dorchester District), Jan. 8, of pneumonia. Mr. Mosely was born in Dorchester, Sept. 20, 1826, and, after the annexation of that town, represented his section of the city in the state legislature for several years. He was formerly a member of the iron firm of Mosely & Hodgman, of Boston. He was a popular and excellent citizen and his death will be widely regretted. He leaves a widow and four children.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods have been reported as follows:
Year ending Dec. 31:

	1880.	1879.	Inc. or dec.	P. c.
Ala. Gt. Southern...	\$643,921	\$444,122	I. \$199,799	45.0
Cues. & Ohio...	2,674,308	1,936,539	I. 737,769	38.7
East Tenn., Va. & Ga.	1,278,879	1,077,223	I. 201,656	18.7
Flint & Pere M...	1,597,445	1,148,024	I. 449,421	39.1
Ind., Bloom. & W.	1,223,097	1,160,743	I. 62,354	5.4
Nash., Chatta. & St. L.	2,049,449	1,800,878	I. 248,571	13.7
Eleven months ending Nov. 30:				
At. Miss. & Ohio...	\$1,882,448	\$1,546,287	I. 336,161	21.7
Net earnings...	865,789	657,331	I. 208,458	31.6
Bur., Cedar Rap. & No.	1,800,063	1,358,745	I. 501,318	36.3
Net earnings...	655,546	470,073	I. 185,473	39.5
Ches. & Ohio...	2,450,299	1,757,378	I. 698,921	39.7
Net earnings...	508,101	379,992	I. 128,109	33.5
Chicago, Burlington & Quincy	16,015,078	13,341,548	I. 2,663,529	20.0
Net earnings...	8,395,066	6,951,766	I. 1,443,300	20.6
Cleve., Mt. Ver. & Del.	386,539	351,754	I. 34,785	9.9
Net earnings...	84,914	45,568	I. 39,346	85.5
Des Moines & Fort Dodge	288,030	201,170	I. 86,860	43.2
Net earnings...	134,775	99,252	I. 35,523	35.0
Louisville & Nash.	8,519,073	5,325,575	I. 3,193,498	60.2
Net earnings...	3,595,432	2,243,384	I. 1,352,048	57.4
Mem., Pad. & No.	196,128	144,640	I. 51,488	35.5
Net earnings...	40,256	14,204	I. 26,052	186.1
New York, L. E. & Western	17,702,577	15,110,874	I. 2,591,703	17.7
Net earnings...	7,657,005	4,597,948	I. 3,059,057	53.4
St. Louis, Iron Mt. & So.	1,903,150	1,855,408	I. 47,742	2.6
Month of November:				
New York, L. E. & Western	\$1,797,337	\$1,515,834	I. \$281,503	18.8
Net earnings...	745,604	558,197	I. 187,407	33.5
Month of December:				
Ala. Gt. Southern...	\$61,009	\$53,478	I. \$7,531	15.5
Ches. & Ohio...	218,039	179,161	I. 38,878	21.6
Chi., Ind., St. L. & Chi.	191,231	180,251	I. 10,980	1.0
E. Tenn., Va. & Ga.	116,880	118,830	D. 1,950	1.6
Flint & Pere M...	151,112	117,026	I. 34,086	29.1
Ind., Bloom. & W.	104,619	106,054	D. 1,435	1.4
Nash., Chat. & St. L.	175,996	185,653	D. 9,657	5.2
Net earnings...	60,091			
First week in January:				
Chi. & Eastern Ill.	\$29,980	\$14,077	I. \$15,903	113.6
Min. & St. Louis...	12,413	10,278	I. 2,135	20.9
Second week in January:				
Northern Pacific...	\$24,983	\$18,378	I. \$6,605	36.6
Week ending Jan. 7:				
Great Western...	\$86,070	\$99,874	D. \$13,804	13.3
Week ending Jan. 8:				
Grand Trunk...	\$189,217	\$174,542	I. \$14,675	8.4

Coal Movement.

Anthracite coal tonnage reported for the week ending Jan. 8 was: 1881, 305,298; 1880, 351,290; decrease, 45,992 tons, or 13.1 per cent.

The following announcement, which gives the programme of the anthracite coal trade for the remainder of the present month, was made Jan. 17 to operators of the Schuylkill Region: "The anthracite coal interests have agreed to work full time during the present week, that is to say from Jan. 17 to 22 inclusive, and resume the stoppage of coal mining the last three days next week, that is to say, stop work on Jan. 27, 28 and 29. Ample notice will be given of any arrangements that may be made for restriction of mining in February."

"To carry out fully the spirit of the agreement it is essential that the mining, hoisting, preparation and loading of coal during those days be entirely discontinued, and it is earnestly hoped that the above agreement for suspension will be carried out by every one in perfect good faith."

This arrangement was made after several days' consultation by representatives of the companies.

Cumberland, Broad Top and Barclay tonnages for the week foot up 45,874 tons.

The official accountant's statement of anthracite tonnages for December and the year, differing somewhat in form from the weekly statements, is as follows:

	December.	1879.	1880.	Year.	1879.
Phila. & Reading...	407,089	550,549	5,933,923	7,442,618	
Lehigh Valley...	369,553	366,156	4,394,532	4,405,957	
Central of New Jersey	276,889	307,337	3,470,142	3,825,554	
Delaware, Lacka. & Western	310,151	339,714	3,550,348	3,897,404	
Del. & Hudson Canal Co.	213,009	270,219	2,674,705	3,014,118	
Pennsylvania R. R. Co.	149,075	119,623	1,864,031	1,682,106	
Pennsylvania Coal Co.	100,018	89,563	1,138,467	1,427,150	
N. Y., Lake Erie & Western	46,473	31,243	411,094	477,782	
Total...	1,878,857	2,074,404	23,437,242	26,142,689	

Decrease for the month, 195,547 tons, or 9.4 per cent.; for the year, 2,705,447 tons, or 10.3 per cent. Four companies show an increase for the month; only one, the Pennsylvania Railroad Company, has an increase for the year, though the decrease on the Lehigh Valley was very small.

The stock of coal on hand at tidewater shipping points on Dec. 31, 1880, was 500,273 tons, against 613,512 at the same time in 1879, and 501,377 in 1878.

The competitive tonnage, including all coal which for final consumption in transit reaches any point on the Hudson River or New York Bay, or which passes out of the capes of the Delaware (sea coal and dust excluded) was: 1880, 10,088,159; 1879, 11,813,798; decrease, 1,725,639 tons, or 14.6 per cent. This competitive tonnage was 43.04 per cent. of the total last year, and 45.18 per cent. the year before.

The total production was divided among the three great anthracite regions as follows in 1880:

	Tons.	P. c.
From the Wyoming Region...	11,410,279	48.72
" " Lehigh Region...	4,463,221	19.05
" " Schuylkill Region...	7,554,742	32.23
Total...	23,437,242	100.00

The decrease in tonnage was greatest from the Schuylkill Region, the chief carrier from which is the Reading road.

The quantity of coal and coke passed through the locks on the Monongahela River, above Pittsburgh, in 1880, was:

	1880.	1879.	Increase.	P. c.
Coal, bushels...	94,048,350	65,588,000	28,460,350	28.3
Coke, bushels...	5,338,800	3,572,700	1,756,100	49.2
Total...	99,387,150	69,160,700	30,226,450	29.2

The quantity in 1880 was equivalent to about 3,396,000 tons, or say, 283,000 car-loads. Part of it was consumed in and about Pittsburgh, but a very large part went down the Ohio River.

The coal tonnage of the Pennsylvania Railroad for 1880, with one week (last in December) missing, was as follows, in tons of 2,000 lbs.:

	1880.	1879.	Inc. or Dec.	P. c.
Anthracite...	1,170,967	1,010,082	I. 160,885	15.9
Semi-bituminous...	2,083,846	1,874,404	I. 209,442	11.2
Bituminous...	2,039,458	1,756,100	I. 283,358	16.1
Coke...	1,794,549	1,170,967	I. 623,582	53.2
Total...	7,088,820	5,011,553	I. 2,077,267	41.4

The last week in the year is usually a very light one and would probably make little difference in the totals.

Bituminous tonnages reported for the year are:

	1880.	1879.	Inc. or Dec.	P. c.
Barclay R.R. & Coal Co.	465,979	364,897	I. 101,082	27.7
Allegheny Region, Pa. R.R.	296,417	202,720	I. 93,697	46.2
Penn. & Westmoreland...	614,862	787,408	D. 172,546	28.2
West Penn. R.R.	281,494	211,305	I. 70,189	33.2
Southwest Penn. R.R.	32,130	42,133	D. 10,003	31.3
Pittsburgh Region, Pa. R.R.	546,166	538,557	I. 7,609	1.4
Total bituminous...	2,537,048	2,147,020	I. 390,028	18.2

Coke tonnages reported for the year are as follows:

	1880.	1879.	Inc. or Dec.	P. c.
Allegheny Region, Pa. R.R.	59,213	101,082	D. 41,869	41.4
Penn. & Westmoreland...	134,820	134,820		
West Penn. R.R.	75,427	75,427		
Southwest Penn. R.R.	1,107,294	1,107,294		
Pittsburgh Region, Pa. R.R.	458,649	458,649		
Total coke...	1,835,403	1,835,403		

Lake Superior Iron Ore.

The Marquette Mining Journal's yearly statement gives the shipments of iron and ore over the Peninsula Division, Chicago & Northwestern via Escanaba for 1880 as follows:

	Tons.
Iron ore by lake...	1,171,765
Iron ore by rail...	57,235
Quartz by lake...	8,400
Pig iron by lake...	4,700
Total...	1,242,100

The ore business of the Marquette, Houghton & Ontonagon road for 1880 was:

	Tons.
Iron ore carried to lake...	689,097
Iron ore delivered to Chicago & N. W. at Negaunee...	33,490
Iron ore delivered to local points...	18,889
Pig iron...	9,382
Total...	750,768

The Mining Journal gives the total output of iron ore from the Lake Superior Region at 1,975,602 tons, an increase of 561,420 tons, or 39.6 per cent. over 1879. The production of pig iron from the furnaces in that region was 48,502 tons, against 39,583 tons the previous year.

Boston-New York Rate Agreement.

A dispatch from Boston, Jan. 18, says: "The agreement for an advance of passenger and freight rates, to go into effect on Feb. 1, was signed yesterday by the Metropolitan Steamship, the Boston & Providence, the Stonington, the New York & New England, the Old Colony, and the New York & New Haven companies. The Boston & Albany Company is not a party to the agreement, but, connecting with the New York & New Haven for passenger business, it is necessarily governed by the rates of that company. The advance in freight rates will be about 75 per cent. The passenger rates will be \$3 by the Sound lines after March 15, and \$4 after June 1, and \$5 by all rail lines for limited tickets."

Grain Movement.

For the week ending Jan. 14 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight weeks:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1874...	3,027,412		1,890,196
1875...	1,611,271		1,634,316
1876...	1,760,946	946,652	1,641,779
1877...	2,391,038	908,682	1,546,128
1878...	1,987,853	1,185,085	2,062,375
1879...	2,936,586	1,277,759	1,778,971
1880...	3,867,056	1,370,697	3,691,855
1881...	2,987,693	2,036,483	2,053,554

Compared with the corresponding week of 1880 there is this year a decrease of 22% per cent. in the receipts and an increase of 48% per cent. in the shipments of the Northwestern markets, with a decrease of 44 per cent. in the Atlantic receipts. The Northwestern receipts were a trifle greater than in the previous week, but with that exception and two others, are smaller than in any week of 1880. The Northwestern shipments, however, are 21% per cent. more than in the previous week, and are the largest since navigation closed, and larger than in any week of last winter until the last week of February. The Atlantic receipts were as small but once in 1880, once in 1879, and not at all in 1878.

Of the Northwestern receipts for the week Chicago had 42.2 per cent., St. Louis 15.8, Peoria 15.3, Milwaukee 13.6, Toledo 6.1, Detroit 4.5, and Cleveland 2.5 per cent.

Of the Atlantic receipts New York had 32 per cent., New Orleans 23.4, Baltimore 17, Boston 16.5, Philadelphia 7.9, Portland 1.9, and Montreal 1.3 per cent. The New York receipts have not been so small before for nearly a year, but there were three weeks last winter when they were smaller; to find as small receipts at Philadelphia we have to go back to July, 1877; there were four weeks in 1880 when Baltimore's receipts were smaller; on the other hand, New Orleans has not had so large receipts before since last September.

Exports from Atlantic ports for five successive weeks have been:

	Jan. 12.	Jan. 5.	Dec. 29.	Dec. 22.	Dec. 15.
Flour, bbls.	189,310	120,499	157,960	138,389	153,302
Grain, bush.	1,800,826	2,206,164	2,611,377	2,363,848	2,646,707

The grain exports of the last week are the lightest that have been reported since last spring at least; but for the eight weeks ending Jan. 12 the exports are not very different from those of the corresponding weeks of the previous year—an increase of 51 per cent. in flour, from 751,920 to 1,135,827 barrels, and a decrease of 5% per cent. in grain, from 23,180,682 bushels to 21,815,380. The increase in flour is equivalent to more than the decrease in grain. The grain exports show an increase of 16 per cent. in wheat and a decrease of 40 per cent. in corn. This is contrary to the usual course of things of late months, corn exports generally hav-

ing been larger and wheat exports smaller. The falling off in corn has been mainly in the last four of the eight weeks, during which the exports were not half as great as in the first four.

For the week ending Jan. 15, receipts and shipments at Chicago and Milwaukee were:

	Receipts.	Shipments.
	1881.	1880.
Chicago...	2,416,679	3,649,119
Milwaukee...	676,002	982,100

For the same week, ending Jan. 15, receipts of grain in bushels and flour in barrels at the four leading Atlantic ports were:

	New York.	Boston.	Philadelphia.	Baltimore.
	1881.	1880.	1881.	1880.
Grain...	818,010	411,980	229,193	420,268
Flour...	1,216,221	237,067	345,400	423,441

San Francisco wheat exports in December were 2,578,525 bushels. For the six months of the California crop year, from July 1 to Dec. 31, the exports were, flour being reduced to wheat in the totals:

	1880.	1879.	Inc. or Dec.	P. c.
Flour, barrels...	301,306	240,068	I. 61,238	25.5
Wheat, bushels...	10,263,557	12,301,483	D. 2,037,926	16.6
Total, bushels...	11,770,087	13,501,823	D. 1,731,736	12.8

Nearly all the wheat went to Great Britain. Of the flour about one-third went to Great Britain, about one-third to China, one-sixth to Central America, and the rest was scattered to Japan, British Columbia and the Pacific islands.

In the six months 690,633 bushels of barley were sent from San Francisco by sea and 228,658 bushels by rail, a total of 919,291 bushels.

The Southwestern Passenger War.

Negotiations for peace having apparently failed, on Jan. 17, the Chicago & Alton adopted a new and even more warlike policy than heretofore. It announced large reductions in passenger fares from Kansas City to the chief points in Michigan and Canada, including Detroit, Grand Rapids, Ann Arbor, Flint Saginaw, Guelph, Toronto and Montreal. The rates are from \$3 to \$6 less from Kansas City than they are from Chicago to the same points. They are on the basis of \$12.18 to Montreal. The Grand Trunk and Flint & Pere Marquette roads are said to have come into the arrangement. The Alton road also made heavy reductions on fares from Omaha to Toledo, Columbus, Indianapolis and other large cities in Indiana and Ohio.

A dispatch from Chicago, Jan. 18, however, says: "The cut in rates between points in the Southwest and Michigan and Canada, announced by the Chicago & Alton Railroad Company yesterday, was followed by telegraphic correspondence to-day between the managements of railroads interested in Southwestern traffic, which has resulted in a compromise which will probably end the long and bitter war in rates which has been carried on between Chicago, St. Louis and Kansas City. Beginning to-morrow, the Illinois Central, Chicago & Alton and Wabash roads will sell tickets from Chicago to St. Louis at \$8.70, with a rebate of \$4, and at the same rate from St. Louis to Kansas City. All the roads, including the Chicago, Burlington & Quincy and the Chicago & Rock Island, will sell tickets for Chicago to Kansas City direct at \$14.80, with a rebate of \$7.30. No round-trip tickets are to be sold at less than regular tariff rates."

"It is claimed that these rates will not admit of the sale by scalpers of the large number of outstanding unlimited tickets. The railway officials to-night are quite confident that the agreement to-day will establish permanent harmony between the roads, and express the opinion that the war is practically ended."

RAILROAD LAW.

Railroad Grade Crossings in Vermont.

The Legislature of Vermont at its recent session passed the following act regulating the movement of trains at the crossing of one railroad by another railroad:

Sec. 1. When a railroad is crossed by another railroad at grades, every engine man on either of the roads shall, before reaching the crossing, stop his engine at some point within 1,000 feet therefrom, shall sound the whistle before starting, and pass slowly over the crossing; but one stop shall be sufficient for all such crossings within 1,000 feet of each other upon the same road.

Sec. 2. An engine man who violates the provisions of the preceding section shall be fined \$100, and the corporation on whose road the offense is committed shall be fined the further sum of \$300; and one-fourth part of each penalty collected shall go to the person making the complaint.

Vermont Railroad Legislation.

Among the laws passed by the Vermont Legislature at its recent session is one prohibiting companies or their employees from leaving hand-cars or other nuisances on the track or right of way at any crossing where horses might be frightened thereby. The penalty is from \$5 to \$20 fine, and liability of the company for any damages that may be caused.

THE SCRAP HEAP.

Locomotive Building.

The Rogers Locomotive Works, in Paterson, N. J., are building 10 locomotives to go to Spain, the first American locomotives ever sent to that country, we believe. They are for the Ferro-Carril de Vals a Villa Nueva y Barcelona; two of them are six-wheel connected engines for construction and yard purposes, and the rest ordinary eight-wheel or American engines, some for passenger and some for freight work.

The Dickson Manufacturing Co., at Scranton, Pa., is building 10 locomotives for the Erie, and 15 for the Delaware & Hudson Canal Co.

The Baldwin Locomotive Works, in Philadelphia, last week received an order for 144 narrow-gauge locomotives for the Denver & Rio Grande road.

The Grant Locomotive Works, in Paterson, N. J., have orders for a number of engines on hand.

Car Notes.

The Gilbert & Bush Co., in Troy, N. Y., has its shops full of work. Orders are on hand for four sleeping and two drawing-room cars for the Wagner Sleeping Car Company; 10 passenger cars for the St. Louis, Iron Mountain & Southern; several passenger cars for the Union Pacific; several passenger cars for the Chesapeake & Ohio, and a lot of open excursion cars for the new Saratoga Lake road. Besides these home orders one was lately received for 10 sleeping cars for a railroad in Brazil.

The Maine Central road has lately ordered six new passenger and 100 freight cars.

The Peninsular Car Co., of Detroit, now employs 200 men at its newly acquired shops in Adrian, Mich. The company has bought more land and will enlarge the works at once.

John L. Gill & Co., at Columbus, O., are building a large number of freight cars for the Toledo, Delphoo & Burlington road.

The Gilbert Car Works, at East Buffalo, N. Y., are building or have orders on hand for 250 refrigerator cars for the New York, Lake Erie & Western; 150 box cars for the New York City & Northern; 100 stock and 100 gondola cars for the Delaware & Hudson Canal Co.'s lines.

The Missouri Car & Foundry Co., in St. Louis, is building a sleeping and a boarding car for construction parties for the Gulf, Colorado & Santa Fe; 500 freight cars for the Chicago, St. Paul, Minneapolis & Omaha; 300 freight cars for the Union Pacific, and 200 box cars for the Illinois Central.

The Illinois Central Railroad shops are now building 300 box cars and 100 coal cars for the road.

The Laconia Car Co., at Laconia, N. H., is building 80 box and 100 flat cars for the Boston, Concord & Montreal; 35 long box cars for the Concord road, and a number of box cars for the Boston & Lowell.

Bridge Notes.

The Philadelphia Bridge Works of Cofrode & Saylor, at Pottstown, Pa., are running night and day, two sets of men being employed.

The Corrugated Metal Co., of East Berlin, Conn., is putting up an iron highway bridge over the Merrimack River at Manchester, N. H., the contract price of which is \$67,000. It is a double-deck four-truss bridge, 40 ft. wide, 1,100 ft. long, in four spans.

The Central Bridge Co., of New York, has the contract for the iron work of the new viaduct over the Illinois Central track at the foot of Randolph street in Chicago.

The Illinois Central has just completed a new wrought-iron Pratt truss bridge, 450 ft. long, over Salt Creek, about 3½ miles south of Clinton, Ill.

Iron and Manufacturing Notes.

The Indianapolis Rolling Mill last year turned out 22,327 tons of iron rails, the largest product ever made by this mill in one year.

Meily Furnace, in Middletown, Pa., has been bought by Haldeman & Ness, and will be repaired and put in blast as soon as possible.

The Gere Iron & Mining Co. is running its furnace at Port Leyden, N. Y., on ore averaging 47 per cent. The furnace is 50 ft. high and 10 ft. bosh, and is making about 170 tons of iron a week, using 110 bushels of charcoal to the ton of pig-iron.

The Glencoe Iron Works, in Youngstown, O., are steadily increasing their manufacture of railroad track bolts.

The L. B. Flanders Machine Works, in Philadelphia, have lately shipped locomotive cylinder boring machines to the shops of the Wisconsin Central road and the Lehigh Valley road, and a valve-seat rotary planing machine to the Maine Central road.

A factory is to be started in Hamilton, Ont., to make railroad lanterns, head-lights and similar work.

The Phosphor-Bronze Smelting Co., limited, has removed its offices to No. 512 Arch street, Philadelphia. In connection with the new offices a sales and show room has been fitted up, where the various products of the company are on exhibition.

The Rail Market.

There has been a good deal of business in steel rails, both American and foreign. Prices are firm at about \$60 per ton at mill, with slight concessions on large orders.

Iron rails are active and slightly higher. Quotations are \$47 to \$53 per ton at mill, according to section of rails. A small sale of English rails at \$44.50 delivered at Galveston is reported, but nothing else below \$47.

Old iron rails are in active demand, but few sales are reported, holders generally asking more than buyers think it safe to pay. Sales are reported in New York at from \$27 to \$31, and in Philadelphia at \$27 to \$30 per ton.

Switch Rods.

A Hibernian switchtender, who saw a train coming in on time, said: "You are first at last, and you were always behind before."

"The Parlor Cattle Car Company" has been incorporated in Cincinnati, and "Boudoir hog cars" are expected next.—*Boston Post.*

An Ohio railroad company, in its report to the state Railroad Commissioner, explains the death of a boy by saying that he was tramping out a bumble-bee's nest on Sunday. The bees got after him and he ran under a train and was killed.—*Elevated Railway Journal.*

Just after the Erie express left Pittsburgh the other evening on the Pittsburgh & Lake Erie Railroad, a bogus conductor got a number of tickets from the passengers and escaped while the real conductor was in another car.

The Dixon (Ill.) *Telegraph* says: "Mr. Burke, one of the directors of the Chicago & Northwestern Railway, one of Governor Charters' old friends, sent Judge Charters and wife a New Year's present, an annual pass, for the year 1881, over all the lines of the Northwestern road, which now embrace 279,892 miles."

The Northwestern is a pretty big road, but it must have grown pretty fast to embrace more than three times as many miles of road as there were in this country a few weeks ago.

A Missing Railroad.

When Cheyenne was at the zenith of its glory, a sign of "General Offices of the Cheyenne, Pacific Slope & Sandwich Islands Railroad" was hung out one morning without creating the least surprise. If one person had asked another where the depot of the said railroad was, there might have been some hesitation about answering, but it was some time after the sign was out before any special inquiries began to be made. Then an Eastern man walked in one day, carpet-bag in hand, and said:

"I suppose you connect at San Francisco with the regular steamers?"

"Well, yes; I suppose we shall," was the hesitating reply.

"Shall? Isn't your road through yet?"

"Well, not quite."

"Do you take in Salt Lake?"

"Salt Lake? Yes. I think we do."

"How much for a ticket?"

"Well, I can't say exactly, as we have none on sale just yet."

"Can't I get one at the depot?"

"Well, I think not, we haven't any depot yet."

"Can I pay on the train?"

"Well, you see, we have no trains yet."

"I suppose I can walk on the track?" persisted the stranger.

"Well, I should have no objection if we had a track."

"No depot, no tickets, no trains, no tracks—what sort of a railroad have you got anyhow?"

"Well, you see, it's only on paper thus far, but as soon as we can sell \$8,000,000 worth of stock we shall begin grading and rush business right along. If you happen to be along when we get to going we will put you through as low as any other responsible route."

The stranger stuck his hands into his pockets, stared hard, whistled softly, and then walked out on tip-toe without another word.—*Wall Street News.*

Blast Furnaces of the United States.

The quarterly statement compiled by the *Iron Age* gives the condition of the blast furnaces of the United States on Jan. 1 as follows:

	In blast.	Out of blast.	Not reported.	Total.
Charcoal.....	160	112	3	275
Anthracite.....	162	76	..	238
Bituminous or coke.....	151	68	..	219
Total.....	473	256	3	732

The total weekly capacity of the 473 furnaces in blast is reported at 94,990 tons, an average of 201 tons each; that of the 256 furnaces out of blast is 40,723 tons, an average of 159 tons each. The total number of furnaces in and out of blast on the first of January, for the past seven years, has been:

	1875.	1876.	1877.	1878.	1879.	1880.	1881.
In blast.....	363	293	244	263	257	384	473
Out of blast.....	328	420	468	449	433	293	256

Though the whole number of furnaces in blast is so much greater than last year, there is a decrease in the number of anthracite furnaces in blast from 165 to 162. Last year 39 per cent. of the charcoal furnaces, 71 of the anthracite, and 61 of the bituminous furnaces were in blast; this year 59 per cent. of the charcoal, 68 of the anthracite, and 70 of the bituminous.

A Scientific Investigation in Frisco.

Some captious people now and then express considerable surprise that the Lick trustees are so slow about executing the behests of that well meaning, but somewhat eccentric old party. Such persons would understand the matter more thoroughly, however, if they could be favored with a profile view of said Board of Trustees slumbering peacefully at their weekly meeting, and listen to some of the reports read before said body by its secretary, who keeps awake himself under protest, and takes cat naps between his sentences. It will be remembered that among the minor bequests of the immense sum left by Mr. Lick was the appropriation of \$5,000, so be expended in ascertaining whether there was any definite evidence of the common assertion made by navigators that the magnetic needle varied in a slight degree more east of north each year, what was the cause of this annual change and the best means of rectifying the same. The amount referred to was, therefore, placed some three years ago, in the hands of a relative of one of the trustees, named Cornelius B. Guffey, whose having just failed as a stock-broker was evidently considered by the board to give him exceptional facilities for the prosecution of this scientific work. Nothing was heard from Mr. Guffey as to the result of his mission until last Tuesday, when, after much somnific "punching up" by the secretary, he submitted the following brief, but exhaustive report:

Gentlemen: On receipt of the funds and instructions concerning same about which you have seen fit to bother me so constantly of late, I at once took active measures to obtain all the information possible on the subject in question, by sounding sundry seafaring men as to their views regarding the magnetic variation, or whatever you call it. This naturally involved the expenditure of considerable time around the wharves as well as large quantities of scientifically applied beer. Out of 710 alleged mariners interviewed on the subject, one said that he had frequently experienced great trouble in boxing the compass, and always thought there was something wrong about it. The remaining 709 said they didn't know. Not deeming this result satisfactory, I determined upon personal investigation. To this end I chartered the plunger Carrie Ann, placed on board a sufficient quantity of scientific materials, such as old Stag whiskey, bottled beer, sandwiches, fishing lines, bait, etc. I then started with a select party of compass sharps to Saucelito to fish for tomcods. The best way to catch tomcods is to bait with spile worms, and about two feet from the surface. Jimmy McGue caught a tommy 22 inches long, but as this is not strictly scientific information, the Trustees can cross it out if they like, or transfer it to their shirt cuffs for future reference. Coming back to the city, owing entirely, it is believed, to the eastward tendency of the compass or something, the boat ran on the rocks at Goat Island and soiled the entire gang overboard. As this could not possibly have occurred without the magnetic needle shifting at least four inches in six hours, your honorable board can draw their own conclusions. A short time after this, a certain able seaman, whose views I had sought, introduced a retired whaler (though then in the business of promoting chicken and canine conflicts), who announced that during a voyage into the Arctic regions after furs, he had personally discovered the exact secret of the magnetic variation, which he was willing to impart for the trifling sum of \$2.50 and the beer. On mature deliberation I closed with these terms, and received from this intelligent person in one word the information for which the combined scientists of the world have been groping for 300 years, to my certain knowledge. It was BEARS. These huge and destructive animals, my informant stated, are in the habit of shoving around the small ice island upon which, he says, the North Pole is situated, just out of pure cussedness, and, of course, disarranging the compass in so

doing. This party, whose name is Philhooliban, or something like that, went on to state that the only way to put an end to this disgraceful practice, and prevent the eventual total destruction of commerce, was to devise some means of exterminating said bears at an early day. After mature reflection he had come to the conclusion, he said, that the only feasible manner of accomplishing this was to poison the critters off. Of course, as it was impracticable to reach those in the immediate vicinity of the Pole, on account of ice, he suggested that your honorable board fit out an expedition of war vessels to approach as near to said point as possible, and fire cannon loaded with the ordinary petrified Dutch bologna sausages of commerce in the direction of the seat of magnetic attraction. Said sausages to be first carefully impregnated with strychnine, or perhaps the ordinary canned vegetables used by our local boarding houses would be more deadly and effective, and nail more bears to the pound. The appropriation being exhausted, this concluded my researches, and I beg leave to submit the appended statement of expenditures for audit and approval:

Time spent in buzzing magnet sharps..... \$15.00

Boat hire..... 2.50

Launch..... 5.50

Philhooliban's theory..... 2.50

Beer..... 4,970.00

Other liquors..... 4.45

One more beer..... 3

Total..... \$5,000.00

Perhaps with another appropriation of same amount (\$10,000 would be better) I could unearth a few more facts.

Respectfully, CORNELIUS B. GUFFEY.

Now it hardly seems possible that in this day and age such a report as the above could be solemnly accepted and passed without comment by anybody, but such is the absurd fact. If proceedings of this nature are not enough to cause old man Lick to turn over in his coffin, then we don't correctly remember what kind of a hair-pin he was, that's all.—*San Francisco Evening Post.*

Fast Passenger Locomotive.

The Grand Trunk Railway, of Canada, has lately put on the division between Belleville and Toronto two locomotives with 6 ft. 3 in. driving wheels and 18 by 36 in. cylinders. This stroke is unusual; in fact the only case which we remember of so long a stroke of piston in a locomotive is that of some engines built by the Camden & Amboy some 20 years ago, which had 14 by 38 in. cylinders.

New Snow-Plow.

The Buffalo *Commercial Advertiser* thus describes a new device for clearing railroad tracks of snow:

"Mr. C. G. Cross, of Chicago, has invented a new snow-plow. It is arranged to be attached to the front end of an ordinary box-car, and is propelled by a portable engine placed inside of the car. The snow is received into a bonnet made of boiler iron, placed in front of the machine, and by a blast of hot air supplied by a fan, is rapidly melted and run down into the water receptacle, and either allowed to flow out at the side, or thrown by a force pump from 50 to 100 ft. from the track. The machine is particularly adapted for deep cuts and in railroad yards, where usually the only method of cleaning the track in deep snow is by expensive manual labor. The first trial was only partially satisfactory, showing that the present form of construction will have to be changed somewhat."

A Long-Headed Brakeman.

The Erie (Pa.) *Dispatch* tells the following story, which our readers will believe, of course: "Brakeman Snodgrass, of Corry, met with an accident at that place while making a coupling that has probably never before been experienced by any man who lived to tell the tale. He had his head caught between the bumpers of two cars and was so horribly squeezed it was not deemed possible he could live, but he is now getting along finely. His head, which was once round, was pressed by the accident out long and slim. He is also from one-half to three-quarters of an inch taller than formerly. The terrible squeeze which his head received has made him cross-eyed, but, strange as it may seem, his mind is as clear and bright as it ever was."

The Amenities of Debate.

We have had occasion once or twice this session to allude to the loving and gentle terms by which the "nobility" of Canada allude to each other in the Dominion Parliament. A while ago in a Hochelaga speech Sir John Macdonald, Premier, got pathetic and said in a few years, after he was dead, he hoped he would look down on the completed Canada Pacific Railroad. It is generally supposed that angels have better business on hand than gazing at cabooses with a mad conductor swearing at a slow brakeman, and so a ripple of ridicule went over Canada at Sir John's celestial allusion. In speaking about the railroad terms on Thursday in Parliament Sir Albert Smith said Sir John would be looking up instead of down. Another noble member said, "Where will you be?" Before Sir Albert could give any information regarding his ultimate destination, a third Knight answered, "He'll be melted." Thus do the titled aristocracy of the neighboring empire arrange the terms on which a railroad is to be built.—*Detroit Free Press.*

Working Both Ways.

Charles Merritt is a Galveston merchant, who deals in such perishable merchandise as apples, potatoes and the like, which he imports by rail. Yesterday the railroad office telephoned him: "If you don't remove that car of freight which arrived yesterday we will charge you demurrage."

Merritt bawled back:

"I say! how much demurrage are you going to charge me on that other car-load of potatoes that ought to have been here a week ago, but has not got here yet?"

There was a silence in that railroad office that would have done credit to the private graveyard of a deaf and dumb asylum.—*Galveston News.*

OLD AND NEW ROADS.

Alpena & Bay City.—Meetings are being held to advocate the building of a railroad from Alpena, Mich., on Thunder Bay, southward through Alcona, Harrisville, Au Sable and Tawas, following nearly the shore of Lake Huron, to Bay City. The distance is about 120 miles, but some 30 miles of road could be saved by making connection with the Jackson, Lansing & Saginaw road.

Atchison, Topeka & Santa Fe.—Notice has been given that the time for closing the subscriptions under circular No. 54 has been extended to Feb. 21, 1881, at close of business, in order that there may be time for adjustment of rights. All subscriptions under the circular must be made as stockholders of record Feb. 1, 1881, as stated in the circular. Rights to take stock at par under the circular have been selling in Boston at \$8 per share.

Atlanta & Alabama.—The incorporators of this company have completed their organization and ordered books opened for subscription. Further proceedings will probably depend upon what response is made to the call for subscriptions. The road is to run from Atlanta, Ga., westward into

the coal fields of Alabama; its location and western terminus are not yet fully decided on.

Baltimore & Ohio.—The Philadelphia *North American* notes current rumors as follows:

"The Baltimore & Ohio Railroad Company is busily intent on plans for a new railroad from Baltimore to this city. The railroad projects before the Delaware Legislature are much talked about. It is said that if Mr. Betts' bill empowering the Delaware Western Railroad to build extensions southwesterly to Maryland, and northeasterly to Pennsylvania, becomes a law, it will prevent the success of the proposed Newark, Wilmington & State Line Railroad, and oblige the Baltimore & Ohio either to make terms with the Delaware Western for the Delaware part of its proposed new line to this city from Baltimore, or to avoid Delaware altogether. It is also hinted that Mr. Betts' bill contains the germ of a new railroad down the peninsula, competing with the Philadelphia, Wilmington & Baltimore's Delaware Division, and using certain old charters said to be in existence for connecting points between New Castle and Milford, or Georgetown, by rail, which, with the extension of the Delaware Western to New Castle, will give another line down nearly through the whole of the state and near the river and bay, with opportunities for the establishment of a great coal shipping port at some point on the Delaware Bay. The Wilmington *Republican's* Dover correspondent hears from good authority that there is not much likelihood of a co-operation being entered into with the Delaware Western. The Delaware Western entrance to Wilmington would be of no use to it, as the track of that road is so tangled up with the Philadelphia, Wilmington & Baltimore that the same delays now taking place at the junction in Philadelphia with Baltimore & Ohio train would probably be of frequent occurrence in Wilmington. The Baltimore & Ohio and Reading people will also probably utilize the old act to incorporate the Delaware & Chester County Railroad Company, passed at Dover, Feb. 5, 1867; and providing that after the building of the proposed line, the line to Landenberg, now in existence, is to be operated as a branch; that the company may have its line when it may connect with any roads now built or to be built in Pennsylvania or Maryland, and that when it may be deemed advisable the capital stock may be merged with such roads. Thus arranged, the new line will enter Delaware a few miles above the Philadelphia, Wilmington & Baltimore line, will almost touch Newark and Kiamensi Mills, and enter Wilmington in the western part, pass right on to the north, cross the Brandywine, near the Augustine Mills, and proceed toward Philadelphia. It will be a double track, and independent of other roads.

This company is about to put dining cars on its lines—not restaurant cars, where dishes are cooked to order, but substitutes for eating-houses, such as have been put on many Western roads of late years, in which a full meal is served at a fixed price.

Bellefonte & Snow Shoe.—It is understood that an agreement has been concluded for the sale of this company's property to the Bald Eagle Valley Company. The details of the agreement have not been published, but the transfer, it is said, will be made soon, and will be really made to the Pennsylvania Railroad Company, which leases the Bald Eagle Valley road. The property consists of a railroad from Bellefonte, Pa., to Snow Shoe, 22 miles (two miles of which is owned in common with the Bald Eagle Valley), and about 50,000 acres of land on which coal has been extensively worked at several points. The price paid is about \$300,000.

Canadian Pacific.—This new Toronto syndicate has formally presented its petition to the Dominion Parliament. Briefly the conditions of the offer to build and maintain the Canadian Pacific Railway by the new company are as follows:

1. The money subsidy asked is \$22,000,000, and the land subsidy 22,000,000 acres, the reduction of \$3,000,000 and 3,000,000 acres being entirely on the central or prairie section.
2. The company ask no exemption from duty on materials imported for use in the construction of the railway or telegraph lines.
3. They ask no exemption from municipal or Dominion taxation on their railway property or capital stock.
4. They do not ask to have the lands exempted from municipal or Dominion taxation for 20 years after they obtain possession of them.
5. They do not ask for any special privileges with respect to the building of branch lines, Parliament being left free to charter new lines to run in any direction the public interest may call for. That is to say, they do not ask for any monopoly of traffic of the Northwest, such as the charter confers on the syndicate.
6. They give the government the privilege of postponing the construction of the eastern section, in which event they are willing to construct the Sault Line, 294 miles long, for a bonus of \$12,000 a mile.
7. They give the government the option of postponing the construction of the western section from Kamloops to Port Moody, which, under the present contract, is to be completed by the government and handed over to the syndicate.
8. They give the government the option of postponing, also, the construction of the mountain division of the central section—450 miles.
9. They propose to give the government the option of assuming possession of the line, or any part of it, and of all property and assets of the company by paying a compensation agreed upon or to be settled by arbitration in the event of failure to agree. The mode of payment of the subsidy and other details are much the same as those provided in the present contract. The road is to be retained in Canadian hands.

One clause of the act makes it imperative on the company to open stock books for public subscription in the cities of Montreal, Toronto, Halifax, St. John, Charlottetown, Winnipeg and Victoria. The directors are also chosen so that the interest of each province, so far as they are represented on the syndicate, shall be represented in the directorate. The stock books are to be open to the public.

The following are the signatures:
W. P. Howland, A. R. McMaster, H. H. Cook, Peleg Howland, Toronto; Wm. Hendric, John Proctor, John Stuart, A. T. Wood, Hamilton; Allan Gilmour, Jas. McLaren, Ottawa; John Walker, D. McFee, London; P. S. Stevenson, Montreal; John Carruthers, Kingston; G. A. Cox, Peterboro; A. W. Ross, Winnipeg; P. Larkins, St. Catharines; K. Chisholm, Brampton; Alex. Gibson, Fredericton; Wm. D. Lovitt & Co., Yarmouth; Barnett & McKay, Renfrew.

Numerous petitions have been presented against the completion of the agreement with the first syndicate to build the road. The debate over the contract still continues in Parliament, with no signs of closing, though some members expect a vote this week.

Carolina Central.—There is some talk of the extension of this road from Shelby, N. C., westward through Hickory Gap and on into North Georgia.

Central of New Jersey.—It is proposed to build a branch about three miles long from Bath or Brodhead's on the Lehigh & Susquehanna Division, to the old town of

Nazareth. It will probably be done if the parties interested will raise a reasonable amount.

Central Vermont and Northern War.—The Boston *Advertiser* of Jan. 15 says: "The directors of the Northern (New Hampshire) Railway held a meeting in this city yesterday and appointed a committee to inquire into the through freight and passenger traffic. The management reported that the business of the Central Vermont line had been diverted contrary to the stipulations of the contract, and that the Northern road was in nowise responsible for the change. It was still ready to take any business brought to it at either of its terminals. During the discussion it was shown that, while in 1872 and 1873 the rate per ton per mile on through business was 1.74 cents, for the last half year the average was 0.42 cent, a rate not sufficient to pay cost of hauling. The Northern road continues to pay the Central Vermont daily balances on the freight for local New Hampshire points, but whether the through traffic would be returned and the old contract be revived was a question. It appears that the Lowell road has given notice to the Boston agent of the Vermont line that, as that road gets none of the east-bound business, and as in this fact the contract has been broken, they must 'decline hereafter to take any of the west-bound freights, unless the rate will pay for hauling.' From competent authority it is learned that on the last 205 cars of this Central Vermont line, the Lowell road only received 10½ cents a ton for hauling them the forty miles to Nashua, and that the Lowell road has now due from that line over \$50,000 in advances paid for shipments to the Allan steamers. The Lowell road, unable to collect this and other advanced freight moneys from the rail line agent, demanded that the roads in the line should pay interest at the rate of five per cent. on this debt. The Central Vermont declined to allow this. The Lowell further decided that, as the contract for the time called for monthly instead of daily settlements, they should hold to the letter of agreement. The Lowell road also has, for the past three years, elevated all the export grain at Mystic wharf free of charge, whereas the other terminal roads have collected one-fourth cent a bushel. As in some months as high as 600,000 bushels have been elevated, it would seem that the liberal policy of the Lowell road must have furnished considerable advantages to this Central Vermont line.

"When, in 1870, this Vermont Central, since known as the Central Vermont line, was formed, it was on a twenty-year contract. The combination was composed of the Central Vermont, Northern, Concord, Nashua, and Boston & Lowell Railroad. All the business of this Central Vermont line was to go over this route, and as an inducement the Boston & Lowell, as the originators of the west bound business, were to give this line a lower rate than it did any other line; hence while this contract was in existence the Central Vermont line had a practical monopoly of the traffic over these routes. By the breaking of this contract and the diversion of the east-bound business, the Lowell claims that they are no longer bound to this arbitrary arrangement in favor of the Vermont line, and they are now encouraging and making quite prominent the route by the way of the Boston, Concord & Montreal and its northern connections. Already these agencies are at work upon the Northern Vermont and Canada business. Connection is made at Wells River with the Montpelier road and with the Portland & Ogdensburg road at Essex Junction, where they can reach Burlington and Swanton; by the Passumpsic and Southeastern they reach Richford, West Farnham and Waterloo, all competing Central Vermont points. The through routes to the Canadas are now doing a thriving business over the Lowell road and its connections, tapping the Grand Trunk's important points by the Occidental route north of the St. Lawrence River. The ice bridge just below Montreal, now serving these lines is furnishing a heavy amount of freight to the Lowell terminal."

Chicago, Burlington & Quincy.—A meeting of the board was held in Boston, Jan. 15, but it is stated that no action was taken as to the stock dividend about which there has been so much talk of late.

The Aurora (Ill.) *Beacon* publishes a statement of number of freight trains and cars over the Chicago Division of this great road for the last three years, as supplied by Mr. George E. Simpson, Chief Train Dispatcher. The totals are as follows:

Aurora to Chicago:			
	Total.		
	No. trains.	No. cars.	
1878.....	5,895	204,041	16.14
1879.....	6,190	213,521	18.95
1880.....	6,902	231,003	18.83
Chicago to Aurora:			
1880.....	6,859	251,081	18.81
Mendota to Aurora:			
1880.....	5,325	200,063	14.61
Aurora to Mendota:			
1880.....	5,323	199,379	14.52
Streator to Aurora:			
1878.....	1,124	25,100	3.09
1879.....	1,251	27,255	3.42
1880.....	1,495	33,661	4.07
Aurora to Streator:			
1880.....	1,497	33,723	4.07

The section from Aurora to Chicago, 38½ miles, is the throat of the whole system. On this the number of cars into Chicago increased 17½ per cent. from 1879 to 1880, and 23 per cent. from 1878 to 1880. The Aurora-Streator line is the coal branch of the road. On this the number of cars to Aurora increased 233 per cent. from 1879 and 33.4 per cent. from 1878 to 1880. There is probably no single line from the West into Chicago by which so many cars reach that city. More cars may arrive from the Northwestern, but it has three separate lines into the city.

Chicago & Northwestern.—This company is putting in a winter bridge over the Missouri at Pierre, Dak., for the purpose of carrying across material for the extension to the Black Hills, on which work will be resumed in the spring.

This company has been consolidating several of its proprietary organizations, probably for convenience merely, as it owns all their stock. The short St. Charles Air Line has been consolidated with the Elgin & State Line, and the Northwestern Union (Milwaukee to Fond du Lac) with the Chicago & Milwaukee. The necessary articles have been filed in Illinois and Wisconsin.

Cincinnati Southern.—The Trustees, having submitted the question of their powers and duties under existing laws to three prominent lawyers of Cincinnati, have received a joint opinion that no power has been conferred on them to sell the road, and that no sale can be made without additional legislation giving specific authority for that purpose.

As the Trustees are a corporation under special charters in Kentucky and Tennessee, it seems probable that legislation from those states as well as Ohio will be needed to authorize a sale.

Cleveland, Columbus, Cincinnati & Indianapolis.—A circular has been issued in London to holders of Atlantic & Great Western 8 per cent. Western Extension certificates

and 7 per cent. Western Extension trust bonds by a committee, of which Sir H. W. Tyler is chairman. This committee has been formed to secure:

1. The independent management and greater prosperity of the Cleveland, Columbus, Cincinnati & Indianapolis, whose shares form the principal security upon which the certificates and bonds are based.
2. The regular publication of the receipts and expenditures of the company. [For some time past monthly statements have been published in New York of gross receipts, but not of expenses.]
3. The proper distribution of the net revenue of the road.

The circular says that the committee, while ready to co-operate with the trustees for the bonds, are anxious to prevent "the continuance of the practice, which has hitherto been too much followed, of retaining in America funds properly available for payment of interest on securities held in England, and of applying the same for additions to or expenditure upon the property, or for any other purpose."

In view of the annual meeting and election to take place in March next, holders of the bonds and certificates named above are requested to deposit their securities with the committee, the Alliance Bank, of London, being named as depository.

Columbia & Greenville.—Receiver Fisher, of the South Carolina Railroad, has filed objections to the discharge of the receiver of the Greenville & Columbia road and the transfer of the property to this new company. He states that the South Carolina Railroad Company has claims against the Greenville & Columbia amounting to \$441,545, and that suits to enforce other claims are now pending, and that all these claims will probably be lost if the receiver is discharged and the property transferred.

Connotton Valley.—The track is laid and the road open for traffic to Mogador, O., 20 miles north by west from Canton, and trains run regularly from the new terminus to Dell Roy, 61 miles. From Mogador to Twinsburg, 23 miles, the road is all graded, the ties distributed, and the steel is bought and lies piled up at Canton ready to be laid as soon as the frost is out of the ground. From Twinsburg to Cleveland the right of way has all been secured and paid for (with the exception of a few city lots), and the grading is under contract to be finished by May 1.

Danville, Mocksville & Southwestern.—The proper name of the new North Carolina Company recently noticed as the Rockingham, Mocksville & Southwestern, should have been given Danville, Mocksville & Southwestern, as above.

Dayton & Southeastern.—The large interests in this road held by R. I. Cummin and V. Winters have recently been sold, and it is reported that they were bought in the interest of the Baltimore & Ohio Company. The road is of 3 feet gauge, but pretty substantially built for a narrow-gauge line: it extends from Dayton, O., to Wellston, 115 miles, crossing the Marietta & Cincinnati at Musselman, 70 miles from Dayton. It could very well be made a feeder for the Marietta & Cincinnati.

Ft. Wayne, Marion & Terre Haute.—This Company has filed articles of incorporation to build a narrow-gauge road from Ft. Wayne, Ind., by Marion to Terre Haute, about 185 miles.

Grand Haven.—A sale of this road has been negotiated by J. W. Converse, Trustee, and a majority of the stockholders have given their assent. The road, originally the Michigan Lake Shore, extends from Allegan, Mich., by Grand Haven to Muskegon, 57½ miles. The stock, which represents the bonded debt before the mortgages were foreclosed and the road transferred to the present company, is \$800,000, and there is a floating debt of over \$200,000. By the terms of the sale the purchaser pays 85 for the stock and is to receive the road free of debt; this will leave about \$55 per share to the stockholders, after paying off the debt. The purchaser is reported to be the Lake Shore & Michigan Company, and the road will cost it about \$11,826 per mile.

Hannibal & St. Joseph.—At a meeting of the board in New York, Jan. 19, it was finally resolved to fund all the indebtedness of the company in new consolidated 6 per cent. 30-year bonds, as heretofore proposed. A meeting of the stockholders, to authorize the necessary new mortgage for \$8,000,000, is called for March 28.

Hannibal & Southwestern.—This company has been organized to build a railroad from Hannibal, Mo., southwest to Brownsville in Saline County, a distance of about 130 miles. The project includes a bridge over the Missouri at Arrow Rock. It is claimed that the road will open a rich lead country.

Indiana, Bloomington & Western.—Notices are out for a special meeting of stockholders on March 15, at which there will be submitted for authorization and ratification a proposed contract for the consolidation of the stock, property and franchises of this company with those of a company to be organized for the purpose of constructing and operating a line of railroad from Indianapolis, Ind., to Columbus, O., under the name of the Ohio, Indiana & Pacific Railway Company, and the Secretary was directed to give notice of such meeting according to law.

Jacksonville, Pensacola & Mobile.—The United States Supreme Court has affirmed the judgment of the Circuit Court, holding that the claim of the Dutch bond holders, Schutte and others to a prior lien on this road and the Florida Central is good, and confirming the decree in all respects. This decision subordinates the claim of the Western North Carolina Company to that of the bondholders. The Circuit Court decree, given early in 1879, fixed the bondholders' claim on the Jacksonville, Pensacola & Mobile at \$2,750,000 and on the Florida Central at \$1,970,000, with nine years' interest in both cases—it would now be about 11 years.

Kansas, Arizona & Pacific.—This company has filed articles of incorporation in Kansas to build a railroad from Leroy in Coffey County, the present terminus of the Missouri Pacific's Kansas & Arizona Division, westward through Southern Kansas to the Colorado line, on a line generally parallel to and south of the Atchison, Topeka & Santa Fe. The organization is in the Missouri Pacific or Gould interest.

Lake Erie & Western.—Agents of this company are now engaged in securing the right of way for the proposed St. Louis Extension across Illinois. Thus far they have been very successful, the people in many cases giving the land required.

Lebanon Springs.—The Receiver has made arrangements by which trains are again run over the short section of this road in Vermont. Since the receivership began trains have stopped at State Line station, but they are now run regularly from Chatham, N. Y., to Bennington, Vt., making connections with the Bennington & Rutland trains.

Long Island.—It is stated that the line of the leased Brooklyn & Montauk road from Hunter's Point to Jamaica is to be made the main line for passenger trains, and that a second track will be laid. The old Long Island track to Ja-

maica will be used for freight. The two lines are not anywhere far apart.

Negotiations are in progress for the extension of the Brooklyn & Montauk road from its present eastern terminus at Patchogue to the Moriches and thence either to Manor on the main Long Island line, or to Speonk on the Sag Harbor Branch. To Manor the distance is about 16 miles.

Marion & Indianapolis.—This company has filed articles of incorporation to build a narrow-gauge road from Marion, Ind., south by west to Indianapolis, about 60 miles. It is supposed to be intended as a branch of the Toledo, Delphos & Burlington.

Mexican Central.—A dispatch from Boston, Jan. 15, says, concerning the allotment of bonds and stocks of this company to subscribers under the recent call: "The amount offered the public was \$5,715,000; the subscription made was double that amount. In accordance with the negotiations recently entered into with persons controlling connecting roads between Mexico and the Mississippi, Jay Gould receives 666 blocks of \$4,500 each—a total subscription of \$2,997,000. Gen. Grant receives 10 blocks, and the other subscribers receive the remainder. These subscriptions are now at 11 per cent. premium, and the old subscriptions are 15 per cent. premium bid."

Midland North Carolina.—At a recent meeting of this company it was decided to make arrangements to begin work on this projected road. The plan is, if possible, to lease the Atlantic & North Carolina road and to secure the use of the North Carolina tracks from Goldsboro to Raleigh and to build a new line from Raleigh to Salisbury to connect there with the Western North Carolina.

Midland, of New Jersey.—Negotiations have been in progress for some time past for a reduction of the rent paid by this company for the Middletown, Unionville & Water Gap road. No conclusion having been reached, the lessor company has notified the Midland to vacate on Jan. 26. The leased road is only 13 miles long, from Unionville to Middletown, but it furnishes nearly all the business which gives any value at all to the Midland. That company threatens to build a parallel line, claiming that the interest on the cost would be less than the present rental.

Minneapolis, Lyndale & Lake Calhoun.—Surveys have been made for an extension of this Minneapolis suburban line from Lake Harriet, Minn., to Excelsior, about 15 miles, and work is to be begun in the spring.

Missouri & Arkansas.—At a meeting held recently in St. Louis it was stated that a preliminary survey from Seligman, Mo., on the St. Louis & San Francisco's Arkansas Branch to Harrison, Boone County, Ark., has been made. Arrangements had been made to begin work at once on this section, and to locate the line from Harrison to Little Rock.

Mobile & Montgomery.—At a meeting held in Montgomery, Ala., Jan. 14, the directors voted to lease this road to the Louisville & Nashville Company. It has been controlled and worked by the Louisville & Nashville for about a year past.

Nashville, Chattanooga & St. Louis.—The following statement is made of the earnings, etc., of this road for December and the six months of the fiscal year from July 1 to Dec 30:

	December.	Six months.
Gross earnings.....	\$175,995.73	\$1,024,743.37
Expenses.....	115,004.29	620,502.12
Net earnings.....	\$60,991.44	\$404,241.15
Interest and taxes.....	39,381.29	234,314.33
New construction and equipment..	80,149.45	206,632.00
Total.....	\$128,530.74	\$440,946.33

Excess of expenditures..... \$67,539.30 \$36,705.18
The new construction and equipment for the six months are made up of \$15,642.75 for real estate; \$65,993.15 for improvements on Northwestern Division; \$27,036.10 for three new engines, and \$97,960 for 4 new passenger, 113 box and 50 flat cars. The surplus over interest and taxes for the six months was equal to 2.48 per cent. on the stock.

New Orleans Pacific.—This company is reported to be negotiating for the purchase of the old New Orleans, Mobile & Texas line from Algiers, La., opposite New Orleans, to Donaldson, 63 miles. This road is owned by Morgan's Louisiana & Texas Company, which bought it several months ago and is said now to ask \$750,000 for it. Nothing definite had been concluded at last accounts. Should this line be bought the New Orleans Pacific will pass some 20 miles west of Baton Rouge, but it is said that the company is negotiating also for the old Baton Rouge, Grosse Tête & Opelousas road to be used as a branch.

New York & New England.—This company has recently given out contracts for three passenger locomotives, six mogul and six consolidation freight locomotives and 400 coal cars.

Being desirous to accommodate the local business on the line as well as possible, the company has recently sent an agent to all the chief stations on the road. Notice of his coming was given at each place, and the people were requested to present complaints to him, or to make suggestions as to the business of their town and its requirements of the railroad.

New York, Ontario & Western.—It is said that this company has let a contract for its proposed tunnel through Bergen Hill to the ferry property which it owns at Weehawken, opposite New York on the Hudson. The tunnel is to be 4,120 ft. long and about 150 ft. below the surface under the crown of the hill. The track of the Jersey City & Albany road will be extended to the tunnel.

Northern Pacific.—The Bismarck (Dak.) Tribune of Jan. 7 says: "The great iron bridge at Bismarck is a fixed fact. The plan has been adopted and the contract let. The structure will be after the style of the Plattsburgh bridge, and George S. Morison, who so successfully engineered the building of that bridge, has been appointed to take charge of the North Pacific bridge. Mr. Morison will arrive in Bismarck next week to begin operations. Granite for the piers is being quarried at Sauk Rapids, Minn., and will be rushed through as fast as possible. The dike is nearly completed, which confines the channel of the river to a width of 1,200 ft. The road has two motives for building the dike. First, it saves one span of iron and gives the foundation for trestle work; and second, it gives the transfer boat a good channel in which to operate during next season, while the building of the bridge continues. This dike will also have a tendency to change the channel and current of the river, so that next spring it is not improbable that the ground where the warehouses are now located, the ways and a large portion of the bottom land southwest of town will disappear and steamboats will be enabled to load and unload their cargoes within half a mile of the business portion of the city. The bridge will be nearly as long as the great bridge at St. Louis, and cost over \$1,000,000. It will consist of three spans, 400 ft. long each, and two short spans, 150 ft. each, one at each end. It will be 70 ft. high, above low water mark, and the foundation of the piers will be the

blue clay and sand-stone rock 45 ft. below the bottom of the river. The present road, as far as First street, will remain about the same as at present, and the curve to the bridge will cross Main street just west of the Catholic church. The bridge will be located just north of the present river warehouses, the level of the bridge being but 30 ft. below the top of the bluffs overlooking the river. Some idea of the height of the bridge and length can be gained by a glance at the eastern approach. The bridge and trestle work will be nearly one mile in length, the western end being in the streets of Mandan. It is the intention of the company to have the bridge completed and ready for use a year from next spring."

Olean, Bradford & Warren.—The directors have voted to take immediate measures towards the completion of the proposed Warren Extension. The location selected will probably be that which extends up Lewis Run to Marshburg and following Chapel Forks to Kinzua village, where it strikes the Allegheny River, along the banks of which it continues to Warren. The estimated cost of the extension is \$400,000 and it is expected to have the road in running order by July 1.

Oxford & Henderson.—The Raleigh & Gaston Company, having given up this projected road, it has been leased to Capt. Williams, who has resumed work on the grading, and will begin to lay track as soon as the weather will permit.

Pennsylvania.—Surveys are being made for the Redstone Branch of the Southwest Pennsylvania Division, which is to extend from Uniontown, Pa., west to Brownsville, the terminus of the Pittsburgh, Virginia & Charleston Division. The distance is about 12 miles. Surveys are also to be made for an extension of the West Newton Branch to Belleverton, on the Monongahela, about 10 miles. Both these projected branches are in the Connellsville coke region.

The Philadelphia North American says: "Ex-Chief Engineer Johnson, of the Fire Department, has been engaged by the Pennsylvania Railroad Company to place the company's property in good condition to escape destruction by fire. Mr. Johnson some time ago made an inspection of the stations along the road, and his recommendations being carried out were found to be productive of so much good that the managers consider it to their advantage to put the control of their entire fire apparatus in his charge. Eleven chemical engines have recently been delivered and will be distributed along the line. Fire brigades will be organized among the employés to operate the engines, and everything that will add to the safety of property will be done."

The Western Union Telegraph injunction suit and the application for further orders in the Junction Railroad case both came up before the United States Circuit Court in Philadelphia, Jan. 17, and both cases were put over to Jan. 24. In the Junction Railroad case the Judge intimated that it may become necessary to have an official inspection, under the authority of the Court, of the ground in question, and the delays experienced, made by railroad experts, before a conclusion is arrived at.

Philadelphia & Reading.—The board of managers has decided to call the stockholders' meeting for March 7. This not being satisfactory to the opposition, argument for the mandamus to compel the board to call a meeting at once was continued, but no decision has been given.

The following notice has been issued by the representatives of the McCalmont stock:

"Notice is hereby given to all whom it may concern, that the issue proposed to be made by the Philadelphia & Reading Railroad Company of \$34,300,000 of deferred bonds and of \$150,000,000 of 5 per cent. funding bonds, will be contested by the undersigned and other stockholders on the ground of illegality, and that a bill will be filed in the United States Circuit Court for the Eastern District of Pennsylvania, asking that said issues be enjoined."

The subscriptions to the deferred bonds, it is stated, amounted to \$70,681,250, of which \$65,500,000 were received in London, \$2,853,550 in New York, and \$2,327,700 in Philadelphia.

In answer to a letter calling attention to certain charges of the Gowen party, President Roberts, of the Pennsylvania Railroad, has sent the following:

"Messrs. F. H. Peabody, George C. Magoun:

"GENTLEMEN: I have your favor of the 13th instant. In reply to your inquiries, I beg to say that the Pennsylvania Railroad Company has not purchased any of the shares of the Philadelphia & Reading Railroad Company, nor has any officer of this company, or any person under its control or in its employment, purchased any shares of that company for the use of the Pennsylvania Railroad Company or in its interest, or with a view of influencing the annual election, either in the interest of the Pennsylvania Railroad Company or in that of any individual. Very truly yours,

"G. B. ROBERTS, President."

The North American says: "President Gowen has held office longer than any of the presidents of the company, with a single exception. The list is as follows: Elihu Chamcey, elected in 1834, and held the office eight years; Wm. T. Emory, in 1842, one year; John Cryder, in 1843, one year; John Tucker, in 1844, twelve years; Robert D. Cullen, in 1856, four years; Asa Whitney, in 1860, one year; Charles E. Smith, in 1861, eight years, and Franklin B. Gowen, in 1869, eleven years."

Philadelphia, Wilmington & Baltimore.—This company has applied to the Delaware Legislature for authority to buy that section of the Pennsylvania & Delaware road between Newark, Del., and Delaware City. The road was sold under foreclosure some time ago and bought for the bondholders, who afterward sold it to the Pennsylvania. That company retains the section from Newark to Pomeroy.

This company is building a new round-house, coal-chutes and water-tank at the Bayview yard, outside Baltimore, where all freight trains are now made up.

Rochester & Braddock Bay.—Subscriptions are being received for the stock of this road, and a considerable amount has already been taken. The road is to be a short suburban line, running from Rochester, N. Y., to Lake Ontario. It will be worked by steam engines, and it is also proposed to try compressed air motors.

St. Louis, Vandalia & Terre Haute.—At the annual meeting of this company at Greenville, Ill., Jan. 11, the report of the President showed the gross earnings for the fiscal year ending Oct. 31, 1880, to have been \$1,552,801.68, and the expenses \$1,106,783.60, leaving net earnings \$446,018.08. The rental, being 30 per cent. of the gross earnings, amounted to \$465,840.50, to which add \$80 from miscellaneous sources, making a total net income to the company of \$465,920.50. From this sum was paid the year's interest on first and second mortgage bonds, \$314,930; taxes, \$28,572.81, and general expenses, \$3,482.10, leaving a surplus of \$118,935.59 from the year's operations, which was applied to the repayment to the lessee of advances heretofore made. Included in the expenses is the sum of \$105,103.94 for permanent improvements and additions to the property.

Syracuse, Chenango & New York.—The Syracuse (N. Y.) Standard of Jan. 15 says: "The negotiations which

have been pending for two or more years, looking toward the purchase of the Syracuse, Chenango & New York Railroad, are likely to be brought to a head within a few days, when the controlling interest in the Chenango Valley road will pass into the hands of a syndicate of eastern capitalists, represented by Gen. William L. Burt, of Boston. The capital stock of the company amounts to \$801,400, of which \$500,000 is common and \$301,400 preferred. The bonded indebtedness is \$261,400. The price which the syndicate proposes to pay is par for the bonds, 50 cents on the dollar for the preferred stock and 10 cents on a dollar for the common stock. The syndicate will also be obliged to pay the accrued interest on the bonds, which has been running for three years past.

"A deposit of \$50,000 has been placed in one of the banks of the city by Gen. Burt, who guarantees to carry out the part of the agreement for the parties whom he represents. The transfer will be made on Feb. 1, if two-thirds of the stockholders agree to the proposition. The recent negotiations have been principally in the hands of A. A. Howlett, as a representative of the company, and it is announced that they are likely to be brought to a successful issue."

"The company which Gen. Burt represents is the Boston, Hoosac Tunnel & Western Railway, of New York, which filed articles of agreement and consolidation with the Boston, Hoosac Tunnel & Western Railway, of Vermont, under the first-mentioned name, in the office of the Secretary of State at Albany last June."

"The Boston, Hoosac Tunnel & Western Company designs to continue its line from Schuylerville, on the Hudson, to Schenectady, where it will cross to the south side of the Mohawk. From that point it will run parallel with the Central road to Limestone Creek, seven miles east of this city, at which point it will join the Chenango Valley road. The purchase will entitle the new company to the right of way through the city, and it is intended to iron the Syracuse & Phoenix road already graded, and continue to Oswego, which is to be the western terminus of the Boston, Hoosac Tunnel & Western road. 'The new deal,' said a gentleman interested, to a Standard reporter last evening, 'will not be likely to result in any change in the present company, the principal object of the purchasers in securing a controlling interest being to obtain the track from Limestone Creek, and the right of way through the city.'

"The Chenango Valley road has had a precarious existence since it was first built in 1870. After a few years it became involved, and upon the petition of the stockholders Hon. J. J. Belden was appointed Receiver in 1879. At the present time the road is meeting its running expenses, but it has never been able to pay from its earnings the interest on its bonded indebtedness. It is 44 miles long, and at Earlville connects with the New York, Ontario & Western road. The city of Syracuse issued bonds to the amount of \$500,000 to help it along."

Telegraph Consolidation.—The agreement for the consolidation of the Western Union, the American Union and the Atlantic & Pacific Telegraph companies has been approved by the directors of the three companies, and will now be submitted to the stockholders. The Western Union meeting is called for Feb. 5. No details of the agreement have been made public as yet, but the general form is as stated last week.

Texas & St. Louis.—Track on this road has been laid to Corsicana, Tex., which is 203 miles from the eastern terminus at Texarkana and 25 miles beyond the last point noted. The stations between Athens and Texarkana are being located and regular trains will soon run through to the new terminus.

Union Pacific.—The board has voted to issue \$10,000,000 new stock to pay for new branches and extensions, and new equipment. The new stock is to be offered to the present stockholders, each to have the right to take one share for five of his present holding.

Washington City, Virginia Midland & Great Southern.—This road has been transferred to the Virginia Midland Company, organized by the purchasers at the late foreclosure sale. The old managers are continued in office, and no change will be made in the working of the road.

The Virginia Court of Appeals has decided that claims for materials furnished prior to the appointment of the Receiver, and amounting to about \$244,000, are valid and prior to the mortgage debt.

The Commissioner who made the sale of the road announces that he is prepared to pay the principal and interest in full to Jan. 1, 1881, of the first and second mortgage bonds of the Orange & Alexandria Railroad Company, and the bonds of the Manassas Gap Railroad Company; also a dividend of 87 per cent. on third-mortgage bonds of Orange & Alexandria, and 72.03 on first-mortgage bonds of Orange, Alexandria & Manassas Railroad Company. The notice is intended for such bonds as have not joined in the scheme for reorganization.

Wisconsin Peninsula.—This company has been organized to build a narrow-gauge road from the town of Green Bay, Wis., north by east up the peninsula between Green Bay and Lake Michigan to its extremity, a distance of about 75 miles. The object is to reach and develop mineral deposits in that region.

ANNUAL REPORTS.

The following is an index to the reports of companies which have been reviewed in previous numbers of this volume of the Railroad Gazette:

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Ligonier Valley.

This company owns a narrow-gauge road from Latrobe, Pa., to Ligonier, 10.5 miles. Its report is for the year ending Dec. 31.

	1880.	1879.	Increase.	P. c.
Gross earnings.....	\$22,545.98	\$13,509.90	\$9,035.90	66.9
Expenses.....	10,322.74	5,769.92	4,552.82	78.5
Net earnings.....	\$12,223.24	\$7,740.07	\$4,483.17	58.2
Gross earn. per mile.....	2,147.24	1,286.60	\$860.64	66.9
Net.....	1,164.12	737.15	\$426.97	58.2
Per cent. of exps.....	45.70	42.70	3.00	....

The net earnings were disposed of as follows:
Net earnings, as above.....\$12,223.24
New equipment and improvements.....\$3,605.84
Interest and principal of debt.....8,617.40

There were carried during the year 34,461 passengers, being more than twice the number for 1879. The local

REPORTS OF NEW YORK RAILROADS TO THE STATE ENGINEER AND SURVEYOR FOR THE YEARS ENDING SEPT. 30, 1880, AND SEPT. 30, 1879.

NAME OF ROAD.	YEAR.	Miles of road.....	Miles of track.....	Number of loco- motives.....	NUMBER OF CARS.				Capital stock.....	Funded debt.....	Floating debt.....	Cost	TRAIN MILES.		
					1st class pass.	2d class pass.	Baggage, mail and express.	Freight.....					Passenger	Freight.....	Service.....
11. New York, Lake Erie & Western.....	1880.....	1,010.4	.....	539	246	74	97	19,609	\$86,536,900	\$67,173,745	.....	\$185,344,575	3,280,456	8,171,901	2,841,539
	1879.....	928.1	.....	504	235	68	93	16,585	85,538,900	60,678,501	\$482,764	3,325,369	3,192,618	8,467,847	212,554
12. Adirondack Co.*.....	1880.....	62.6	.....	3	4	.....	3	55	4,293,000	.....	.....	.....	28,362	23,780	None.
	1879.....	60	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	28,362	.....	.....
13. Boston & Albany.....	1880.....	323.7	.....	248	169	None	66	5,710	20,000,000	7,000,000	186,202	27,514,116	1,403,754	3,422,218	624,757
	1879.....	323.7	.....	243	184	None	55	5,435	20,000,000	7,000,000	186,202	27,514,116	1,366,103	3,523,669	.....
14. Brooklyn, Bath & Coney Island.....	1880.....	7	11	6	28	.....	.....	5	500,000	80,000	4,440	333,315	71,580	None.	None.
	1879.....	7	10.5	8	27	.....	.....	3	500,000	80,000	4,440	314,513	74,409	.....	.....

NAME OF ROAD.	YEAR.	Number of passengers.	Passenger miles.....	Tons carried	Ton-miles.....	GROSS EARNINGS.				WORKING EXPENSES.						Net earn.....	Interest.....	Rentals.....	Dividends.....
						Passenger	Freight	Other	Total.....	Mainten- ance of road.....	Mainten- ance of equip- ment.....	Mainten- ance of equip- ment.....	Operat- ing.....	Total					
11.....	1880.....	5,491,431	180,460,204	8,715,892	1,721,112,090	3,682,950	14,391,115	619,042	18,093,109	2,187,964	1,906,426	7,549,536	11,643,925	\$	7,049,184	3,963,873	662,953	3,911,138	
	1879.....	4,894,527	149,115,708	8,212,641	1,569,222,417	3,118,944	12,233,481	589,598	15,942,623	2,289,216	1,784,304	7,101,179	11,174,698		4,767,924	2,047,713	658,445	.....
12.....	1880.....	27,116	906,730	38,701	1,066,174	30,178	55,246	7,495	92,919	24,214	8,347	30,419	62,680		29,939	.....	.....	.....
	1879.....	22,302	683,638	22,970	710,077	27,485	44,643	6,453	78,382	26,680	5,065	30,175	61,821		18,661	.....	.....	.....
13.....	1880.....	5,991,297	113,154,374	3,310,539	375,452,804	2,361,489	4,530,913	848,707	7,741,119	1,447,789	985,338	2,815,373	5,248,501		2,592,618	470,000	75,000	800,000	
	1879.....	5,199,160	101,248,321	2,738,096	325,484,700	2,165,699	3,588,839	672,925	6,427,463	972,179	528,850	2,222,795	3,723,825		2,703,639	470,000	75,000	1,600,000	
14.....	1880.....	290,702	1,602,422	None.	None.	40,692	None.	6,104	46,696	23,788	7,141	19,870	50,797		Deficit.	5,600	.....	.....
	1879.....	337,569	1,181,491	None.	None.	51,676	1,187	749	53,612	8,761	11,680	21,668	42,119		11,494	5,000	.....	5,898

* Receiver's report; gives operations of road only. † This amount is only cost of improvements made by the present company. ‡ Mixed trains only run.

freight moved was 901 tons; through or bulk freight, 1,431 car-loads.

Rome, Watertown & Ogdensburg.

The company owns a line from Rome, N. Y., to Ogdensburg, 141.11 miles, with branches to Cape Vincent, 24.24 miles; to Potsdam, 24.24 miles; to Syracuse, 44.50 miles, and from Oswego, N. Y., to Lewiston, 146.17 miles. It leases the Oswego & Rome road, from Richland to Oswego, 28.58 miles, making 380.30 miles owned and 408.88 worked. The following statements are from the report of the New York State Engineer for the year ending Sept. 30.

The stock and debt at the close of the last two fiscal years were as follows:

	1880.	1879.
Stock paid in.	\$5,293,900	\$5,293,900
Funded debt.	\$862,600	\$757,900
Floating debt.	438,078	297,778
Total.	\$14,554,478	\$13,651,578

The funded debt was increased by \$862,600 and the floating debt diminished by \$159,700. The large increase of funded debt is not explained, unless it was in settlement of overdue interest.

The earnings for the year were as follows:

	1879-80.	1878-79.	Increase.	P. c.
Gross earnings.	\$1,467,895	\$1,113,288	\$354,607	31.9
Expenses.	980,156	834,640	145,516	17.4
Net earnings.	\$487,739	\$278,648	\$209,091	75.1
Gross earn. per mile.	3,300	2,723	577	21.2
Net " "	1,193	681	512	75.1
Per cent. of exps.	66.77	74.99		

There was a very large increase both in gross and net earnings. The payments reported from the net earnings were as follows:

Net earnings as above.	\$487,739
Interest paid.	\$260,533
Rental Oswego & Rome road.	24,000
Balance.	\$203,204

In explanation of the amount of interest paid, it should be stated that default was made in the payment of the interest on the consolidated bonds in April, 1878, and that probably nothing has been paid on them since. If the consolidated coupons had been met as they matured, the interest account would have been larger by about \$300,000. The net balance appears to have been used in payment of floating debt, which was reduced \$159,700, as above.

Pennsylvania & New York.

This company owns the line which extends the Lehigh Valley from Wilkesbarre to the Erie road at Waverley. Its stock is all held by the Lehigh Valley, and the following statements were submitted at the annual meeting of that company this week. The fiscal year ends Nov. 30, 1880.

The tonnage of coal of all kinds for the year was 1,140,981 tons, a decrease of 49,082 tons, or 4.12 per cent. In general freight there was a large gain, and also in passengers.

The earnings for the year were as follows:

	Earnings.	Expenses.	Net earnings.
From Transportation of Coal.	\$791,583	\$330,301	\$461,282
General freight.	713,489	354,044	359,445
Passengers, express and mail.	156,171	90,870	65,304
Canal business.	207	1,599	*1,392
Miscellaneous.	30,397		30,397
Total.	\$1,691,847	\$776,714	\$915,133
Total, 1879.	1,322,937	723,146	599,791
Increase.	\$368,910	\$53,568	\$315,342
Per cent.	27.9	7.4	52.6

* Deficit.

The expenses were 45.91 per cent. of gross earnings, against 54.66 per cent. the previous year. The net receipts enable the company to pay 9 per cent. per annum on stock.

Except coal, all branches of business show an improvement. All the bridges are now of iron and double-tracked, except one which is now under way. Only 15 miles of iron rails remain in the track.

The Buffalo Creek Railroad earned \$89,056, of which \$43,295 was for expenses, leaving \$25,761 for net profits, of which the half coming to the Pennsylvania & New York Company was spent for renewals.

Lehigh Valley.

The following statements are from the report presented at the annual meeting this week for the year ending Nov. 30, 1880, and are published in advance of the full report.

The capital account at the close of the year was as follows:

Preferred stock.	\$100,300
Common stock, including scrip not converted.	27,496,895
Total stock.	\$27,603,195
Six per cent. bonds of 1880.	\$5,000,000
Seven per cent. bonds of 1910.	6,000,000
Consolidated mortgage bonds.	14,304,000
Easton & Amboy first-mortgage bonds.	2,100,000
Total.	\$55,007,195

There has been an addition of \$174,340 to the common stock during the year, a reduction of \$133,000 in the consolidated mortgage bonds, caused by the drawing of as many sterling bonds, and the floating debt, which last year was \$347,359, less cash on hand, is now nothing. The first sale of Easton & Amboy first-mortgage bonds was made during the year, and \$2,100,000 were disposed of, the proceeds being used for various purposes, such as new equipment, construction and other necessary expenses.

The coal tonnage for the year was as follows:

	1880.	1879.	Increase.	P. c.
Anthracite.	4,606,415	4,361,785	244,630	5.6
Bituminous.	65,306	53,499	11,807	23.9
Total.	4,672,724	4,415,284	257,440	5.8

The total tonnage last year was the largest ever carried over the road in one year. The receipts for transportation were also greater than for five years past, the return to producers and transporters yielding a reasonable profit for the first time in that period.

The total receipts were as follows:

	1880.	1879.	Increase.	P. c.
Income from all sources.	\$8,600,934	\$9,640,364	\$2,060,570	31.5
Expenses of the road.	4,002,357	2,996,981	1,005,376	33.5
Net income.	\$4,598,577	\$3,543,383	\$1,055,194	29.8
Net income for the year.	\$1,630,112	\$1,630,112		
Dividends, preferred stock, 10 per cent.	10,630			
" " common stock, 4 per cent.	1,098,427			
General expenses, interest, taxes, loss on Morris Canal.	742,952			
Charged off for estimated accumulated depreciation.	990,338			
Total.	4,472,159			

Balance to credit of profit and loss. \$126,418
The increase of net income was so great that after paying the usual dividends a charge of nearly a million dollars was made to cover estimated depreciations of property, and there still remained an increase of \$103,055 in the balance carried to profit and loss.

The earnings of the road itself were as follows.

	Earnings.	Expenses.	Net earn.
From transportation of Coal.	\$5,352,604	\$2,480,316	\$2,872,288
General freight.	1,879,573	1,171,258	708,315
Passengers, express and mails.	530,813	350,783	180,030
Total.	\$7,762,990	\$4,002,357	\$3,760,633
Total, 1879.	5,932,326	2,996,981	2,935,345
Increase.	\$1,830,664	\$1,005,376	\$825,288
Per cent.	30.9	53.5	28.1

The total expenses were 51.56 per cent. of gross earnings, against 50.52 per cent. in 1879. The increase was due to various improvements made on the lines of the road.

This year completes the first quarter of a century of the existence of the company, during which there have been transported 60,027,387 tons of coal, and the receipts have been \$96,947,130, of which \$45,271,210 have been spent for expenses. Over \$40,000,000 went for labor to the employees of the Lehigh Valley and its controlled companies. The dividends paid amounted to 175.83 per cent. in cash and 72.48 in stock—an average of 9.92 per cent. per annum. The Lehigh Valley Coal Company mined last year from 14 collieries 1,386,033 tons of coal.

Delaware & Hudson Canal Company's Leased Lines.

The following statements are from reports made to the New York Engineer for the year ending Sept. 30, 1880, for the lines in New York leased to the Delaware & Hudson Canal Company. The first of these is substantially owned by the lessees, which holds all, or nearly all, the stock and is the

NEW YORK & CANADA.

This road consists of a main line from Whitehall, N. Y., to Rouse's Point, 112.42 miles, with 37.49 miles of branches, making 149.91 miles in all. The capital account by the last two reports is as follows:

	1880.	1879.
Stock.	\$4,000,000	\$4,000,000
Funded debt.	4,000,000	4,000,000
Floating debt.	43,612	35,138
Total.	\$8,043,612	\$8,035,138

The only change was a slight increase in floating debt. The earnings for the year were as follows:

	1879-80.	1878-79.	Increase.	P. c.
Gross earnings.	\$846,067	\$425,009	\$421,058	52.0
Expenses.	297,576	235,432	62,144	26.4
Net earnings.	\$548,491	\$189,577	\$358,914	189.4
Interest paid.	215,478	235,432	20,000	8.5
Surplus.	\$333,013			
Deficit.	\$107,830			
Gross earn. per mile.	4,310	2,833	1,477	52.0
Net " "	1,998	850	1,148	134.4
Per cent. of exps.	54.35	70.00		

Heretofore a uniform charge of 70 per cent. for working expenses has been made; last year a different plan seems to have been adopted. The increase in both gross and net earnings was very large, and the road earned a surplus over interest for the first time.

RENSSELAER & SARATOGA.

This company owns and leases 182.62 miles of road, the longest single line being from Troy, N. Y., to Whitehall, 72.55 miles; from Schenectady to Saratoga, 20 miles, and from Salem to Rutland, 61.98 miles.

The following statement shows the stock and debt:

Stock.	\$6,854,100
Funded debt.	2,000,000
Total.	\$8,854,100

The rental is 8 per cent. on the stock and 7 per cent. on the funded debt and rental of sub-leased lines. The earnings were as follows:

	1879-80.	1878-79.	Inc. or Dec.	P. c.
Gross earnings.	\$1,824,300	\$1,486,456	\$337,844	22.7
Expenses.	558,948	809,670	250,722	18.4
Net earnings.	\$1,265,352	\$676,786	\$588,566	87.0
Rental paid.	770,099	770,485	386	0.05
Surplus.	95,261			
Deficit.	\$83,699			
Gross earn. per mile.	\$9,980	\$8,140	1,840	22.7
Net " "	4,737	3,706	1,031	27.8
Per cent. of exps.	52.57	54.47		

On this line, also, the gain was very large, and a surplus over all charges is the result, against a loss for several years past.

ALBANY & SUSQUEHANNA.

This road consists of a main line from Binghamton, N. Y., to Albany, 142.51 miles, with branches from Quaker Street to Schenectady, 13.79 miles, and from Cobleskill to Cherry Valley, 20.99 miles, making 177.29 miles in all. The rental is 7 per cent. on the stock and debt, with some smaller charges.

The stock and debt are as follows:

Stock.	\$3,500,000
Funded debt.	6,045,000
Total.	\$9,545,000

A considerable part of the bonds has been issued to the lessee for improvements made. The earnings were as follows:

	1879-80.	1878-79.	Inc. or Dec.	P. c.
Gross earnings.	\$1,538,982	\$1,218,237	\$320,745	26.3
Expenses.	881,694	659,969	221,725	33.6
Net earnings.	\$657,288	\$558,268	\$99,020	17.7
Rentals paid.	721,371	700,761	20,610	2.9
Deficit.	\$64,083	\$142,493	\$78,410	55.0
Gross earn. per mile.	8,681	8,371	310	3.7
Net " "	3,707	3,140	567	18.0
Per cent. of exps.	57.29	54.18		

This line still shows a deficit—very much reduced from last year—in spite of the large gain in earnings.

The net surplus to the lessee from the three roads was \$90,684, against a loss of \$344,122 the preceding year, making a saving of \$434,806 for the year.

Dayton & Union.

This road extends from Dodson, O., to Union City, Ind., 32 miles, and its trains use the Dayton & Western track from Dodson to Union, 15 miles. It is operated by trustees for account of the bondholders. The following statements are for the year ending Oct. 31.

The earnings for the year were as follows:

Earnings (\$4,254.63 per mile).	\$126,148.11
Expenses (51.33 per cent.).	60,880.92
Net earnings (\$2,070.85 per mile).	\$65,267.19
Other charges.	20,885.27
Net surplus.	\$86,152.46

The average proportion of expenses to gross earnings for nine years past has been 53.73 per cent. During the year 101,937 passengers were carried; trains of all classes ran 138,035 miles, fuel costing 4.74 cents per locomotive mile.